

# STIC Search Report

## EIC 1700

STIC Database Tracking Number: 184283

TO: Dawn Garrett  
Location: REM 10C79  
Art Unit : 1774  
April 7, 2006

Case Serial Number: 10/729737

From: Mei Huang  
Location: EIC 1700  
REMSEN 4B28  
Phone: 571/272-3952  
Mei.huang@uspto.gov

### Search Notes

Examiner Garrett,

*(from electron 1/30/06)*

- 26 hits having all three compounds in a single reference, see L11, page 1. All 26 references are displayed.
- 524 hits having the compound of para 3, see L9, page 1.
- 577 hits having the compound of para 2, see L10, page 1.
- Didn't display the later two but have saved them. Please let me know if you'd like to have a further search on them or just need to display some of them.

Please feel free to contact me if you have any questions or if you would like to refine the search query,

Thank you for using STIC services!

Mei Huang



=> fil reg  
 FILE 'REGISTRY' ENTERED AT 15:41:25 ON 07 APR 2006  
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=> d his

(FILE 'HOME' ENTERED AT 14:36:22 ON 07 APR 2006)

FILE 'HCAPLUS' ENTERED AT 14:36:35 ON 07 APR 2006  
 E US20050123797/PN

L1 1 S E3  
 SEL RN

FILE 'REGISTRY' ENTERED AT 14:38:34 ON 07 APR 2006

L2 3 S E1-3  
 L3 1 S 124729-98-2/RN  
 L4 1 S 58328-31-7/RN  
 L5 1 S 94928-86-6/RN  
 E IR (PPY)3/CN  
 L6 1 S E3

FILE 'HCAPLUS' ENTERED AT 15:33:05 ON 07 APR 2006

L7 501 S L5  
 L8 77 S L6  
 L9 524 S L3  
 L10 577 S L4  
 L11 26 S (L7 OR L8) AND L9 AND L10  
 L12 1 S L1 AND L11  
 L13 577 S L7 OR L8  
 SAV L13 GAR737A1/A  
 SAV L9 GAR737A3/A  
 SAV L10 GAR737A2/A

FILE 'REGISTRY' ENTERED AT 15:41:25 ON 07 APR 2006

=> fil hcap  
 FILE 'HCAPLUS' ENTERED AT 15:41:31 ON 07 APR 2006  
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
 COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)

=> d l11 ibib abs hitstr hitind 1-26

L11 ANSWER 1 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:1292800 HCAPLUS  
 DOCUMENT NUMBER: 144:29553  
 TITLE: Organic electroluminescent device  
 INVENTOR(S): Nagara, Yoshiaki; Yamamoto, Ichiro; Mori, Kenji;  
 Murasaki, Takanori  
 PATENT ASSIGNEE(S): Kabushiki Kaisha Toyota Jidoshokki, Japan  
 SOURCE: PCT Int. Appl., 50 pp.

DOCUMENT TYPE: CODEN: PIXXD2  
 LANGUAGE: Patent  
 FAMILY ACC. NUM. COUNT: 1 Japanese  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005117499	A1	20051208	WO 2005-JP8601	20050511

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

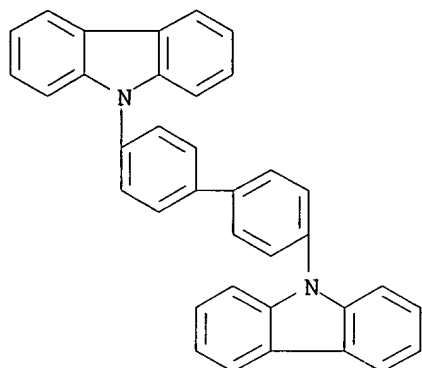
PRIORITY APPLN. INFO.: JP 2004-162042 A 20040531

AB Disclosed is an org. electroluminescent device (EL) wherein at least one light-emitting layer and a cathode are arranged on an anode in this order. The light-emitting layer contains an electron-transporting material, a hole-transporting material and a luminescent dopant. Also disclosed is an org. EL device wherein at least a red light-emitting layer, a blue light-emitting layer, a green light-emitting layer and a cathode are arranged on an anode in this order. The blue light-emitting layer and the green light-emitting layer contain at least one common deriv.

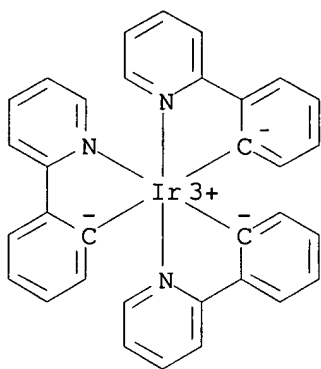
IT 58328-31-7 94928-86-6, Tris(2-phenylpyridine)iridium 124729-98-2  
 RL: DEV (Device component use); USES (Uses)  
 (org. electroluminescent device)

RN 58328-31-7 HCAPLUS

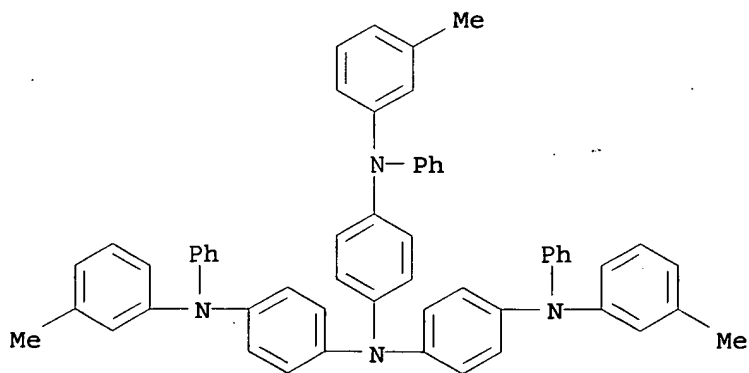
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H05B033-14  
ICS H05B033-22  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 22  
IT 147-14-8, Copper phthalocyanine 2085-33-8 4733-39-5  
58328-31-7 94928-86-6, Tris(2-phenylpyridine)iridium 124729-98-2 142289-08-5,  
4,4'-Bis(2,2-diphenylvinyl)biphenyl 185690-41-9 369612-04-4,  
2,8-Di(tert-butyl)perylene 376367-93-0 444716-92-1 870282-90-9  
870282-91-0  
RL: DEV (Device component use); USES (Uses)  
(org. electroluminescent device)  
REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L11 ANSWER 2 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2005:497308 HCAPLUS  
DOCUMENT NUMBER: 143:34919  
TITLE: Organic electroluminescent devices with additive  
INVENTOR(S): Kondakova, Marina E.; Young, Ralph H.  
PATENT ASSIGNEE(S): USA  
SOURCE: U.S. Pat. Appl. Publ., 22 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005123797	A1	20050609	US 2003-729737	20031205
WO 2005057678	A1	20050623	WO 2004-US39827	20041129

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW  
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: US 2003-729737 A  
20031205

AB Disclosed is an electroluminescent device comprising a cathode and

an anode and, located therebetween, a light-emitting layer (LEL) comprising a phosphorescent guest material, a hole- and electron-transporting host material, and an efficiency-enhancing material having an ionization potential lower than that of the host material and a triplet energy level that is lower than that of the phosphorescent guest material by  $\leq 0.2$  eV. Such a device provides useful light emission features.

IT 58328-31-7, CBP 94928-86-6 124729-98-2,

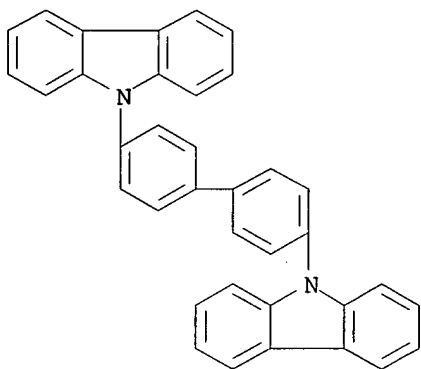
MTDATA

RL: DEV (Device component use); USES (Uses)

(org. electroluminescent devices with additive having specified ionization potential and triplet energy level)

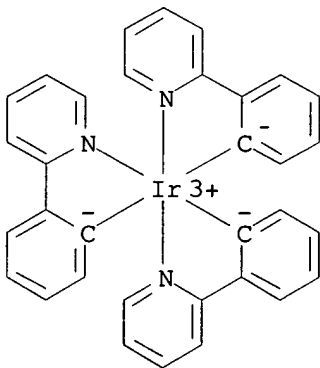
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



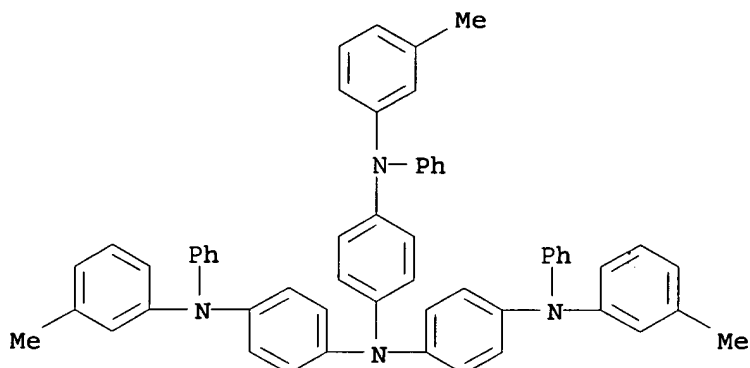
RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl- $\kappa$ N)phenyl- $\kappa$ C]-, (OC-6-22)- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H05B033-14  
 INCL 428690000; 428917000; 313504000; 313506000; 313112000; 257098000  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 IT 58328-31-7, CBP 94928-86-6 124729-98-2,  
 MTDATA  
 RL: DEV (Device component use); USES (Uses)  
 (org. electroluminescent devices with additive having specified ionization potential and triplet energy level)

L11 ANSWER 3 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:304640 HCAPLUS  
 DOCUMENT NUMBER: 142:363476  
 TITLE: Doping of organic opto-electronic devices to extend reliability  
 INVENTOR(S): Forrest, Stephen R.; D'Andrade, Brian Wendell; Chwang, Anna  
 PATENT ASSIGNEE(S): USA  
 SOURCE: U.S. Pat. Appl. Publ., 20 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005074629	A1	20050407	US 2003-680065	20031006
WO 2005038945	A1	20050428	WO 2004-US32810	20041006

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,

VC, VN, YU, ZA, ZM, ZW  
 RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,  
 AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,  
 DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL,  
 PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
 GW, ML, MR, NE, SN, TD, TG

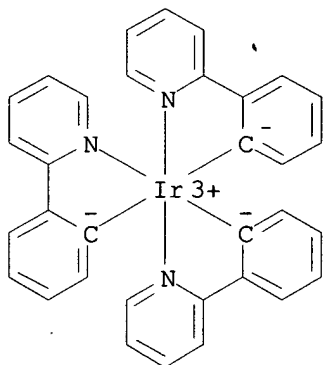
PRIORITY APPLN. INFO.:

US 2003-680065

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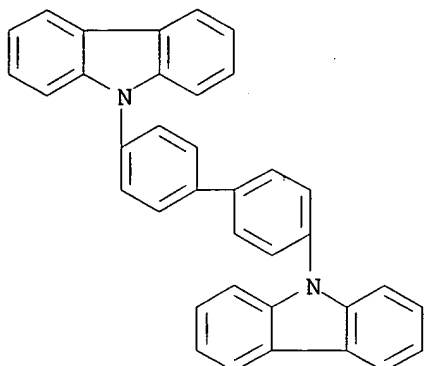
200310  
06

- AB The present invention is directed to multi-layer org. devices having improved stability, wherein at least one layer of the device comprises a host material that is morphol. unstable and a dopant material that provides improved morphol. properties to the layer. The layer may be incorporated into, for example, OLEDs, org. phototransistors, org. photovoltaic cells, and org. photodetectors.
- IT 94928-86-6, fac-Tris(2-phenylpyridine) iridium  
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
 (CBP doped with; doping of org. opto-electronic devices to extend reliability and improve morphol. stability)
- RN 94928-86-6 HCAPLUS
- CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) - (9CI) (CA INDEX NAME)

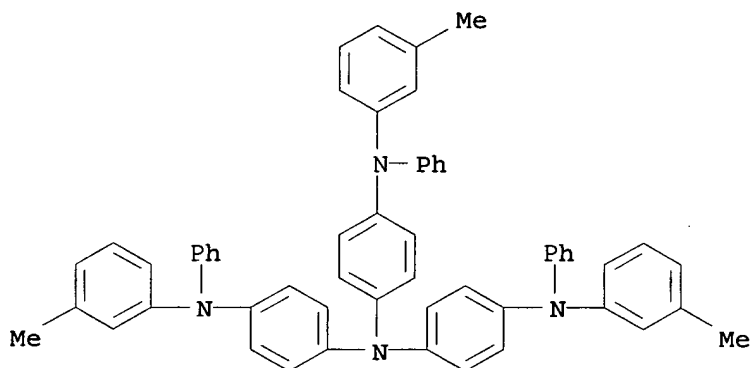


- IT 58328-31-7, CBP  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (Ir(ppy)3-doped; doping of org. opto-electronic devices to extend reliability and improve morphol. stability)
- RN 58328-31-7 HCAPLUS
- CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)





IT 124729-98-2, MTDATA  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (p-doped layer; doping of org. opto-electronic devices to extend  
 reliability and improve morphol. stability)  
 RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-  
 methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H05B033-12  
 INCL 428690000; 428917000; 313504000; 313506000  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related  
 Properties)  
 Section cross-reference(s): 76  
 IT 94928-86-6, fac-Tris(2-phenylpyridine) iridium  
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP  
 (Properties); USES (Uses)  
 (CBP doped with; doping of org. opto-electronic devices to extend  
 reliability and improve morphol. stability)  
 IT 58328-31-7, CBP  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (Ir(ppy)3-doped; doping of org. opto-electronic devices to extend  
 reliability and improve morphol. stability)  
 IT 124729-98-2, MTDATA  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)

(p-doped layer; doping of org. opto-electronic devices to extend reliability and improve morphol. stability)

L11 ANSWER 4 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:34313 HCAPLUS  
 DOCUMENT NUMBER: 142:103508  
 TITLE: Organic light emitting device structure for  
 obtaining chromaticity stability  
 INVENTOR(S): Tung, Yeh-Jiun; Ngo, Tan  
 PATENT ASSIGNEE(S): USA  
 SOURCE: U.S. Pat. Appl. Publ., 36 pp., Cont.-in-part of  
 U.S. Ser. No. 618,160.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005006642	A1	20050113	US 2004-761980	20040120
US 2005006641	A1	20050113	US 2003-618160	20030710
US 6885025	B2	20050426	US 2003-618160	A2 20030710

PRIORITY APPLN. INFO.: A2 20030710

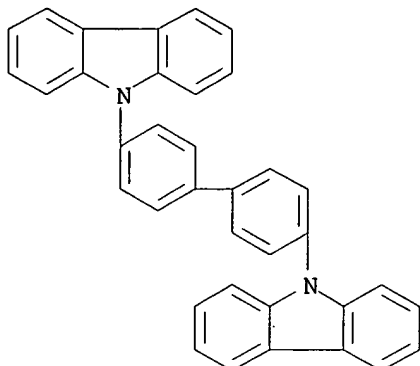
AB An org. light emitting device is described comprising an anode; an emissive region; and a cathode, wherein the emissive region comprises a first emissive layer, comprising a first host material and a first emissive material, and a second emissive layer in phys. contact with the first emissive layer and comprising a second host material and a second emissive material, and wherein: the first emissive layer is nearer to the anode than the second emissive layer, and at least one of the first emissive material or the second emissive material is a phosphorescent emissive material.

IT 58328-31-7, CBP 124729-98-2

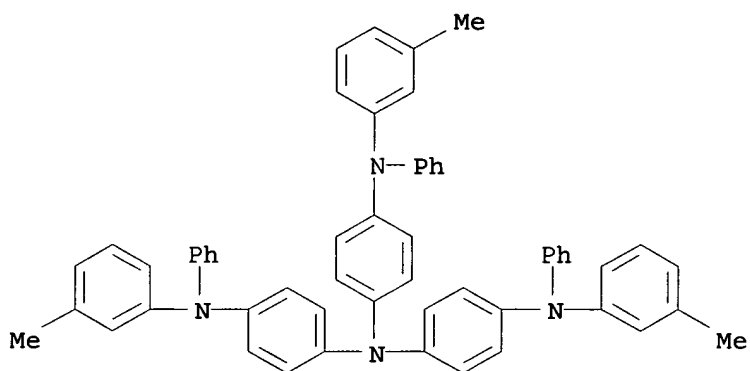
RL: DEV (Device component use); USES (Uses)  
 (light emitting device contg.; org. light emitting device structures using phosphorescent phosphor for obtaining chromaticity stability)

RN 58328-31-7 HCAPLUS

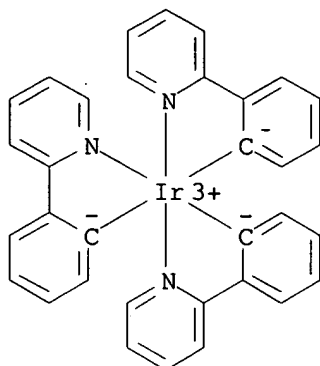
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IT 94928-86-6  
 RL: DEV (Device component use); USES (Uses)  
 (phosphorescent material; org. light emitting device structures  
 using phosphorescent phosphor for obtaining chromaticity  
 stability)  
 RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



IC ICM H01L035-24  
 INCL 257040000  
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 73, 76  
 IT 147-14-8, Copper phthalocyanine. 1662-01-7, 4,7-Diphenyl-1,10-phenanthroline 2085-33-8, Alq3 19205-19-7, N,N'-Dimethylquinacridone 29261-33-4, Tetrafluoro-tetracyano-quinodimethane 50851-57-5 50926-11-9, Indium tin oxide 51325-91-8, DCM 58328-31-7, CBP 80730-94-5 123847-85-8, NPD 124729-98-2 126213-51-2, Poly(3,4-ethylenedioxythiophene) 146162-54-1 150405-69-9, TAZ 192198-85-9, TPBi 550378-78-4  
 RL: DEV (Device component use); USES (Uses)  
 (light emitting device contg.; org. light emitting device structures using phosphorescent phosphor for obtaining chromaticity stability)  
 IT 94928-86-6 337526-95-1 359014-72-5 459133-59-6 512182-81-9 664374-04-3 665005-28-7  
 RL: DEV (Device component use); USES (Uses)  
 (phosphorescent material; org. light emitting device structures using phosphorescent phosphor for obtaining chromaticity stability)

L11 ANSWER 5 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:34312 HCAPLUS  
 DOCUMENT NUMBER: 142:103507  
 TITLE: Organic light emitting device structures for obtaining chromaticity stability  
 INVENTOR(S): Tung, Yeh-Jiun; Lu, Michael; Kwong, Raymond C.  
 PATENT ASSIGNEE(S): Universal Display Corporation, USA  
 SOURCE: U.S. Pat. Appl. Publ., 30 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2005006641 A1 20050113 US 2003-618160 200307  
10  
US 6885025 B2 20050426  
US 2005006642 A1 20050113 US 2004-761980 200401  
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PRIORITY APPLN. INFO.: US 2003-618160 A2 200307  
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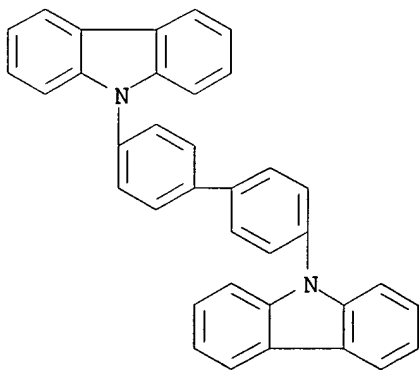
AB An org. light emitting device is described comprising an emissive region disposed between and elec. connected to an anode and a cathode, wherein the emissive region comprises: a first emissive layer, comprising a first host material and a first emissive material, and a second emissive layer in phys. contact with the first emissive layer and comprising a second host material and a second emissive material, and wherein the contact between the first emissive layer and the second emissive layer provides an electron injection barrier, a hole injection barrier, or both, the first emissive layer is nearer to the anode than the second emissive layer, at least one of the first emissive material or the second emissive material is a phosphorescent emissive material, and wherein the device emits with CIE x,y-coordinates that vary <.apprx.0.04 over the luminance range of about 1000 cd/m<sup>2</sup> to about 20,000 cd/m<sup>2</sup>.

IT 58328-31-7, CBP 124729-98-2

RL: DEV (Device component use); USES (Uses)  
(light emitting device contg.; org. light emitting device structures using phosphorescent phosphor for obtaining chromaticity stability)

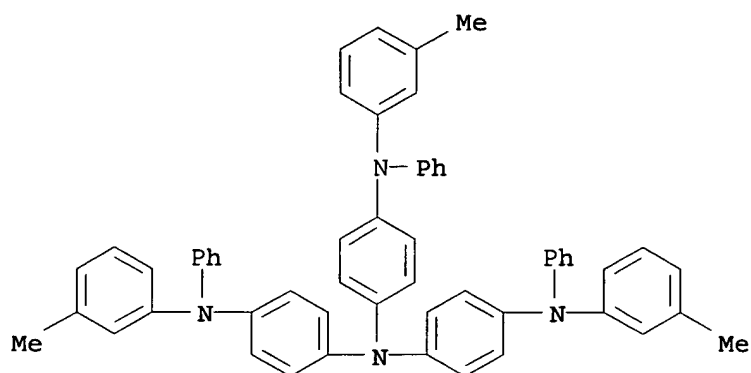
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)

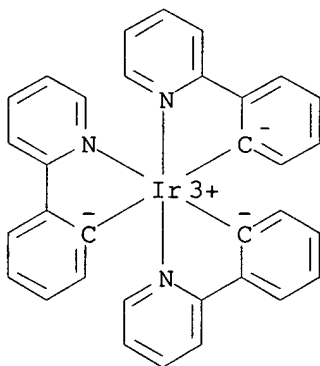


IT 94928-86-6

RL: DEV (Device component use); USES (Uses)  
 (phosphorescent material; org. light emitting device structures  
 using phosphorescent phosphor for obtaining chromaticity  
 stability)

RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



IC ICM H01L051-00

INCL 257040000

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and  
 Other Reprographic Processes)

Section cross-reference(s): 73, 76

IT 147-14-8, Copper phthalocyanine. 1662-01-7, 4,7-Diphenyl-1,10-  
 phenanthroline 2085-33-8, Alq3 19205-19-7, N,N'-  
 Dimethylquinacridone 29261-33-4, Tetrafluoro-tetracyano-  
 quinodimethane 50851-57-5 50926-11-9, Indium tin oxide  
 51325-91-8, DCM 58328-31-7, CBP 123847-85-8, NPD  
 124729-98-2 126213-51-2, Poly(3,4-ethylenedioxythiophene)  
 146162-54-1 150405-69-9, TAZ 192198-85-9, TPBi 550378-78-4

RL: DEV (Device component use); USES (Uses)  
 (light emitting device contg.; org. light emitting device  
 structures using phosphorescent phosphor for obtaining  
 chromaticity stability)

IT 94928-86-6 337526-95-1 359014-72-5 459133-59-6  
 512182-81-9 664374-04-3 665005-28-7  
 RL: DEV (Device component use); USES (Uses)  
 (phosphorescent material; org. light emitting device structures  
 using phosphorescent phosphor for obtaining chromaticity  
 stability)  
 REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

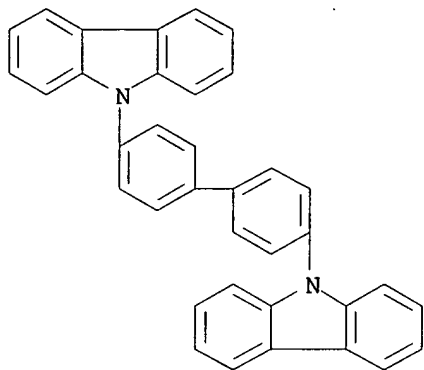
L11 ANSWER 6 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:141597 HCAPLUS  
 DOCUMENT NUMBER: 140:171981  
 TITLE: Organic photonic integrated circuit using a  
 photodetector and a transparent organic light  
 emitting device  
 INVENTOR(S): Forrest, Stephen R.; Peumans, Peter; Hack,  
 Michael; Bulovic, Vladimir  
 PATENT ASSIGNEE(S): USA  
 SOURCE: U.S. Pat. Appl. Publ., 23 pp., Cont.-in-part of  
 U.S. Ser. No. 219,760.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004031966	A1	20040219	US 2002-254265	200209 25
US 2004031965	A1	20040219	US 2002-219760	200208 16
PRIORITY APPLN. INFO.:			US 2002-219760	A2 200208 16

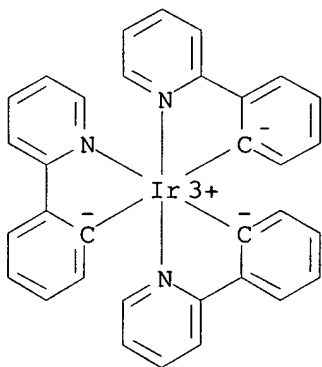
AB An org. photonic integrated circuit device is described comprising  
 an org. light emitting device, and an photodetector disposed  
 adjacent the org. light emitting device, the photodetector being  
 adapted to detect light emitted by the org. light emitting device.  
 The photodetector, which can be org. or inorg. type, may share a  
 transparent electrode with the org. light emitting device. The  
 device may include a feedback circuit connected to the org. light  
 emitting device and the org. photodetector, the feedback circuit  
 being adapted to adjust the current passing through the org. light  
 emitting device based on the light detected by the org.  
 photodetector. Use of the device as a display device is also  
 described.

IT 58328-31-7, CBP 94928-86-6  
 RL: DEV (Device component use); USES (Uses)  
 (emission layer; org. photonic integrated circuit using org.  
 photodetector and transparent org. light emitting device sharing

transparent electrode)  
 RN 58328-31-7 HCAPLUS  
 CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)

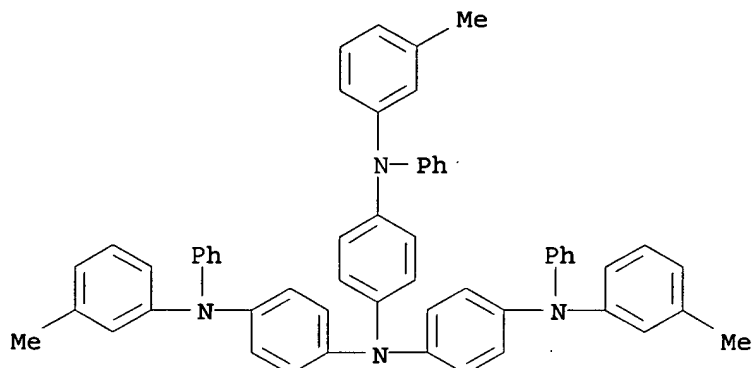


RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI) (CA INDEX NAME)



IT 124729-98-2, MTDATA  
 RL: DEV (Device component use); USES (Uses)  
 (light detecting p-doped layer; org. photonic integrated circuit  
 using org. photodetector and transparent org. light emitting  
 device sharing transparent electrode)  
 RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)





IC ICM H01L031-12

INCL 257079000

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 74, 76

IT 58328-31-7, CBP 94928-86-6

RL: DEV (Device component use); USES (Uses)  
(emission layer; org. photonic integrated circuit using org. photodetector and transparent org. light emitting device sharing transparent electrode)

IT 124729-98-2, MTDATA

RL: DEV (Device component use); USES (Uses)  
(light detecting p-doped layer; org. photonic integrated circuit using org. photodetector and transparent org. light emitting device sharing transparent electrode)

L11 ANSWER 7 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:141596 HCAPLUS

DOCUMENT NUMBER: 140:171980

TITLE: Organic photonic integrated circuit using an organic photodetector and a transparent organic light emitting device

INVENTOR(S): Forrest, Stephen R.; Peumans, Peter; Hack, Michael; Bulovic, Vladimir

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 22 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2004031965	A1	20040219	US 2002-219760	20020816
US 2004031966	A1	20040219	US 2002-254265	200209

WO 2004017413 A1 20040226 WO 2003-US25937 25  
200308  
18  
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,  
CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,  
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK,  
SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA,  
ZM, ZW  
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,  
BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,  
EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,  
SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG  
AU 2003259918 A1 20040303 AU 2003-259918 200308  
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PRIORITY APPLN. INFO.: US 2002-219760 A2 200208  
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WO 2003-US25937 W 200308  
18

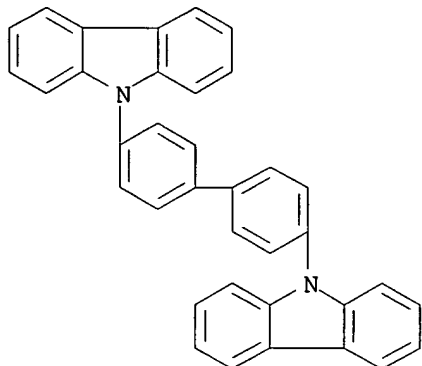
AB An org. photonic integrated circuit device is described comprising  
an org. light emitting device, and an org. photodetector disposed  
adjacent the org. light emitting device, the photodetector being  
adapted to detect light emitted by the org. light emitting device.  
The photodetector may share a transparent electrode with the org.  
light emitting device. The device may include a feedback circuit  
connected to the org. light emitting device and the org.  
photodetector, the feedback circuit being adapted to adjust the  
current passing through the org. light emitting device based on the  
light detected by the org. photodetector.

IT 58328-31-7, CBP 94928-86-6

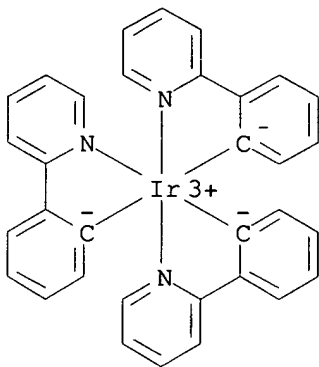
RL: DEV (Device component use); USES (Uses)  
(emission layer; org. photonic integrated circuit using org.  
photodetector and transparent org. light emitting device sharing  
transparent electrode)

RN 58328-31-7 HCAPLUS

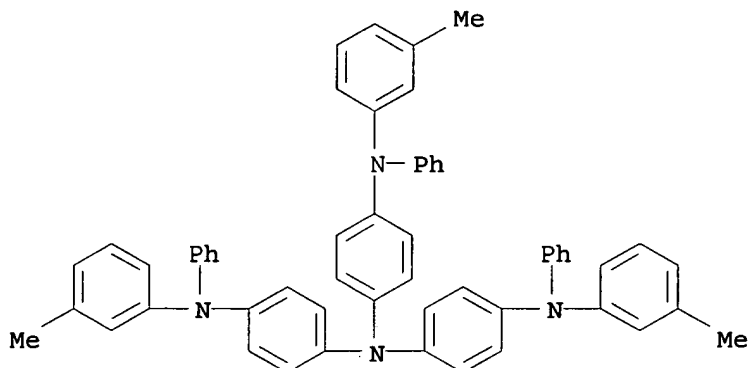
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) -  
 (9CI) (CA INDEX NAME)



IT 124729-98-2, MTDATA  
 RL: DEV (Device component use); USES (Uses)  
 (light detecting p-doped layer; org. photonic integrated circuit  
 using org. photodetector and transparent org. light emitting  
 device sharing transparent electrode)  
 RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-  
 methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L027-15  
ICS H01L031-12; H01L033-00  
INCL 257079000  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 76  
IT 58328-31-7, CBP 94928-86-6  
RL: DEV (Device component use); USES (Uses)  
(emission layer; org. photonic integrated circuit using org. photodetector and transparent org. light emitting device sharing transparent electrode)  
IT 124729-98-2, MTDATA  
RL: DEV (Device component use); USES (Uses)  
(light detecting p-doped layer; org. photonic integrated circuit using org. photodetector and transparent org. light emitting device sharing transparent electrode)

L11 ANSWER 8 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2003:989871 HCAPLUS  
DOCUMENT NUMBER: 140:50040  
TITLE: Very low voltage, high efficiency phosphorescent OLED in a p-i-n structure  
INVENTOR(S): Forrest, Stephen R.; Pfeiffer, Martin  
PATENT ASSIGNEE(S): USA  
SOURCE: U.S. Pat. Appl. Publ., 9 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

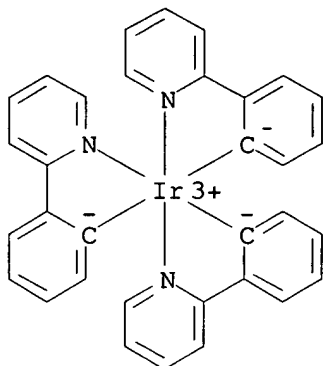
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003230980	A1	20031218	US 2002-173682	20020618
WO 2003107452	A1	20031224	WO 2003-US19593	20030618

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,  
 CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,  
 GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
 LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
 NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL,  
 TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
 ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,  
 BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,  
 EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,  
 SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
 NE, SN, TD, TG

AU 2003256279 A1 20031231 AU 2003-256279 200306  
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 EP 1552568 A1 20050713 EP 2003-760485 200306  
 18  
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,  
 PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,  
 SK  
 JP 2005530320 T2 20051006 JP 2004-514158 200306  
 18  
 PRIORITY APPLN. INFO.: US 2002-173682 A 200206  
 18  
 WO 2003-US19593 W 200306  
 18

AB Org. light-emitting devices are described which comprise an anode  
 disposed over a substrate; a p-doped org. layer disposed over and  
 elec. connected to the anode; a phosphorescent org. emissive layer  
 disposed over and elec. connected to the p-doped org. layer; an  
 n-doped org. layer disposed over and elec. connected to the  
 phosphorescent org. emissive layer; and a cathode disposed over and  
 elec. connected to the n-doped org. layer, where a blocking layer is  
 disposed between and elec. connected to the p-doped and/or the  
 n-doped org. layer and the emissive layer, the blocking layer  
 adapted to block electrons/holes and excitons from entering the  
 doped org. layer. In addn. to the device having a cathode on the  
 top, an "inverted" device having a cathode on the bottom is also  
 discussed.

IT 94928-86-6, Tris(2-phenylpyridine)iridium  
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP  
 (Properties); USES (Uses)  
 (dopant; very low voltage, high efficiency phosphorescent OLED in  
 p-i-n structure contg.)  
 RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)

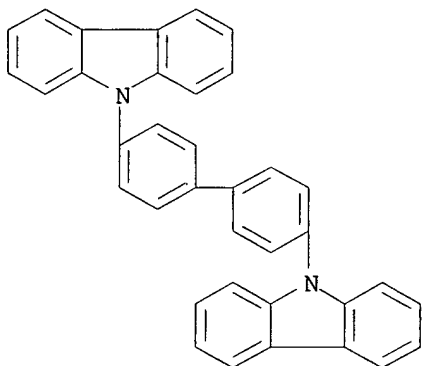


IT 58328-31-7, CBP 124729-98-2

RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(very low voltage, high efficiency phosphorescent OLED in p-i-n structure contg.)

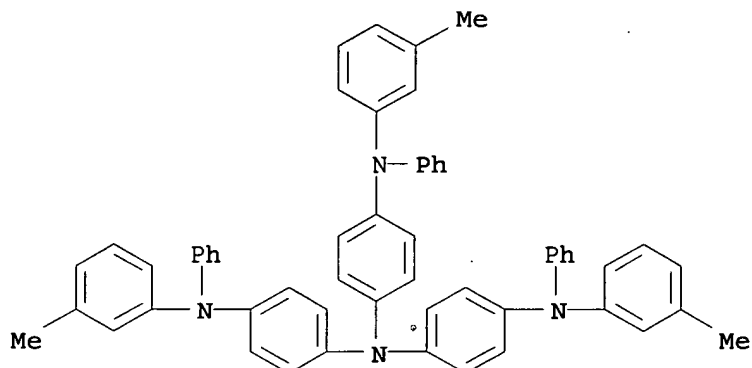
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L035-24  
 INCL 313600000; 257040000  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 22, 76  
 IT 7439-93-2, Lithium, properties 94928-86-6,  
 Tris(2-phenylpyridine)iridium  
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
 (dopant; very low voltage, high efficiency phosphorescent OLED in p-i-n structure contg.)  
 IT 147-14-8, Copper phthalocyanine 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 58328-31-7, CBP 124729-98-2 150405-69-9, TAZ  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (very low voltage, high efficiency phosphorescent OLED in p-i-n structure contg.)

L11 ANSWER 9 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2003:880291 HCAPLUS  
 DOCUMENT NUMBER: 140:84329  
 TITLE: Operational stability of electrophosphorescent devices containing p and n doped transport layers  
 AUTHOR(S): D'Andrade, Brian W.; Forrest, Stephen R.; Chwang, Anna B.  
 CORPORATE SOURCE: Department of Electrical Engineering, Princeton University, Princeton, NJ, 08544, USA  
 SOURCE: Applied Physics Letters (2003), 83(19), 3858-3860  
 CODEN: APPLAB; ISSN: 0003-6951  
 PUBLISHER: American Institute of Physics  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The operational stability of low-operating voltage p-i-n electrophosphorescent devices contg. fac-tris(2-phenylpyridine) Ir as the emissive dopant is studied. In these devices, Li-doped 4,7-diphenyl-1,10-phenanthroline (BPhen) served as an n-type electron transport layer, or as an undoped hole blocking layer (HBL), and 2,3,5,6-tetrafluoro-7,7,8,8-tetracyanoquinodimethane

doped 4,4',4''-tris(3-methylphenylphenylamino) triphenylamine served as a p-type hole transport layer. The glass transition temp. of BPhen can be increased by the addn. of Al(III)bis(2-Me-8-quinolinato)4-phenylphenolate (BALq), resulting in improved morphol. stability, thereby reducing device degrdn. When thermally stable BALq was used as a HBL in both p-i-n and undoped devices, the extrapolated operational lifetime (normalized to an initial luminance of 100 cd/m<sup>2</sup>) of the p-i-n and undoped devices are 18,000 and 60,000 h, resp., indicating that the presence of p and n dopants can accelerate device degrdn.

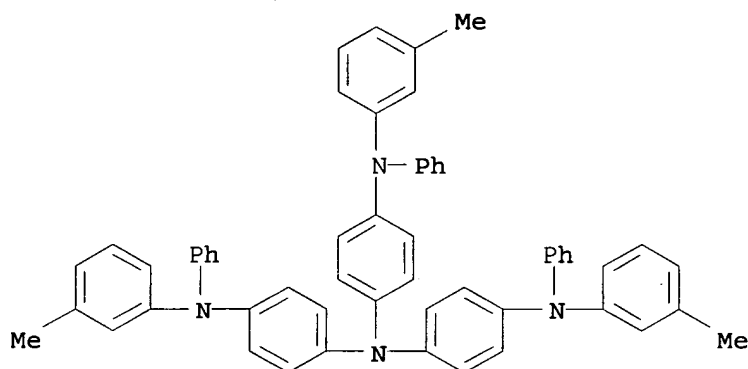
IT 124729-98-2, MTDATA

RL: DEV (Device component use); USES (Uses)

(2,3,5,6-tetrafluoro-7,7,8,8-tetracyanoquinodimethane-doped MTDATA; operational stability of electrophosphorescent devices contg.)

RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IT 58328-31-7, 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis-

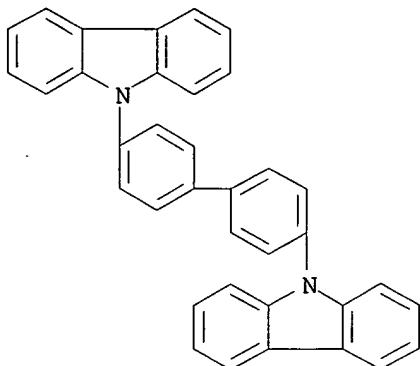
RL: DEV (Device component use); USES (Uses)

(Ir(ppy)<sub>3</sub>-doped CBP luminescent layer; operational stability of electrophosphorescent devices contg.)

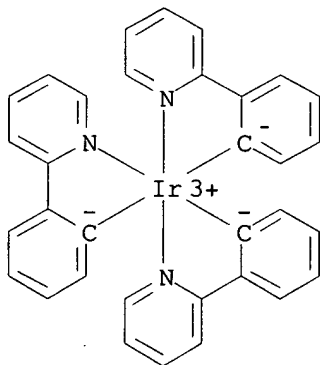
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)





IT 94928-86-6, fac-Tris(2-phenylpyridine)iridium  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (Ir(ppy)3-doped CBP luminescent layer; operational stability of  
 electrophosphorescent devices contg.)  
 RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) -  
 (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related  
 Properties)  
 Section cross-reference(s): 69, 76  
 IT 124729-98-2, MTDATA  
 RL: DEV (Device component use); USES (Uses)  
 (2,3,5,6-tetrafluoro-7,7,8,8-tetracyanoquinodimethane-doped  
 MTDATA; operational stability of electrophosphorescent devices  
 contg.)  
 IT 58328-31-7, 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis-  
 RL: DEV (Device component use); USES (Uses)  
 (Ir(ppy)3-doped CBP luminescent layer; operational stability of  
 electrophosphorescent devices contg.)  
 IT 94928-86-6, fac-Tris(2-phenylpyridine)iridium  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)

(Ir(ppy)3-doped CBP luminescent layer; operational stability of electrophosphorescent devices contg.)

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L11 ANSWER 10 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:422828 HCAPLUS

DOCUMENT NUMBER: 140:49921

TITLE: A low drive voltage, transparent, metal-free n-i-p electrophosphorescent light emitting diode

AUTHOR(S): Pfeiffer, M.; Forrest, S. R.; Zhou, X.; Leo, K.

CORPORATE SOURCE: Department of Electrical Engineering, Center for Photonics & Optoelect. Mat., Princeton, NJ, 08544, USA

SOURCE: Organic Electronics (2003), 4(1), 21-26

CODEN: OERLAU; ISSN: 1566-1199

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We demonstrate a transparent, inverted, electrophosphorescent n-i-p org. light emitting diode (OLED) exhibiting a luminance of 500 cd/m<sup>2</sup> at 3.1 V, and with a luminous power efficiency of 23 lm/W when light emitted from both top and bottom surfaces is summed. We find that 10% more light is emitted from the top surface; hence a power efficiency of 12 lm/W is obtained for a device viewed through the top, transparent contact. This device, with applications to head-up and displays employing n-type Si driver circuitry, has significantly higher power efficiency and lower drive voltage than undoped fluorescent inverted OLEDs. Efficient injection of both electrons and holes is made possible by controlled n- and p-doping of the transport layers with high doping levels. The light emitting region is protected from ITO sputtering damage by a 210 nm thick p-doped hole transport layer. The transparency of the device at the peak OLED emission wavelength of 510 nm is (80 ± 5)%.

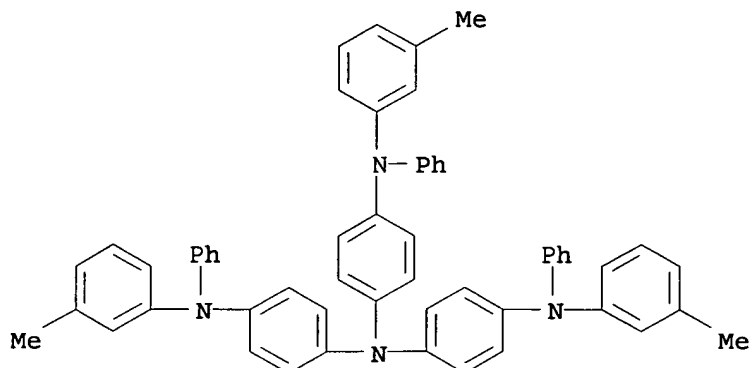
IT 124729-98-2, 4,4',4''-Tris-(3-methylphenylphenylamino)triphenylamine

RL: DEV (Device component use); USES (Uses)

(doped with F4-TCNQ; low drive voltage, transparent, metal-free n-i-p electrophosphorescent light emitting diode)

RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)

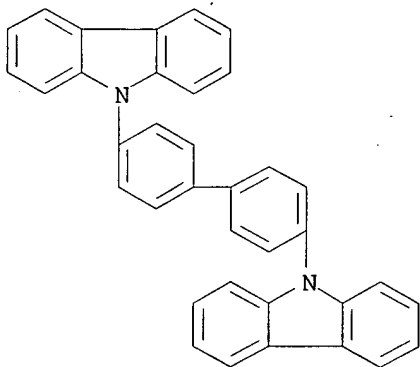


IT 58328-31-7

RL: DEV (Device component use); USES (Uses)  
(doped with iridium phenylpyridine complex; low drive voltage,  
transparent, metal-free n-i-p electrophosphorescent light  
emitting diode)

RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
NAME)

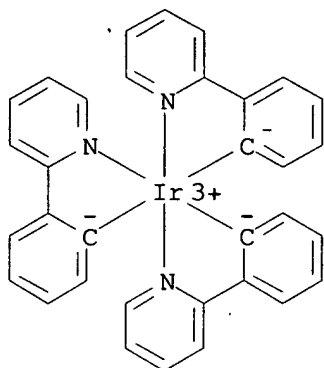


IT 94928-86-6

RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(low drive voltage, transparent, metal-free n-i-p  
electrophosphorescent light emitting diode)

RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
(9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 147-14-8, Copper phthalocyanine 124729-98-2,  
4,4',4''-Tris-(3-methylphenylphenylamino)triphenylamine  
RL: DEV (Device component use); USES (Uses)  
(doped with F4-TCNQ; low drive voltage, transparent, metal-free  
n-i-p electrophosphorescent light emitting diode)

IT 58328-31-7  
RL: DEV (Device component use); USES (Uses)  
(doped with iridium phenylpyridine complex; low drive voltage,  
transparent, metal-free n-i-p electrophosphorescent light  
emitting diode)

IT 94928-86-6  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(low drive voltage, transparent, metal-free n-i-p  
electrophosphorescent light emitting diode)

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L11 ANSWER 11 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:417054 HCAPLUS

DOCUMENT NUMBER: 139:140632

TITLE: High-efficiency low-voltage stable inverted  
transparent electrophosphorescent organic  
light-emitting diodes: Combining electrically  
doped carrier transport layers and  
iridium-complex doped emissive layer

AUTHOR(S): Zhou, X.; Blochwitz-Nimoth, J.; Pfeiffer, M.;  
Maennig, B.; Drechsel, J.; Werner, A.; Leo, K.

CORPORATE SOURCE: Institut für Angewandte Photophysik, Technische  
Universität Dresden, Dresden, D-01062, Germany

SOURCE: Synthetic Metals (2003), 137(1-3), 1063-1064  
CODEN: SYMEDZ; ISSN: 0379-6779

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors demonstrated high-efficiency low-voltage stable inverted  
transparent electrophosphorescent org. light-emitting diodes

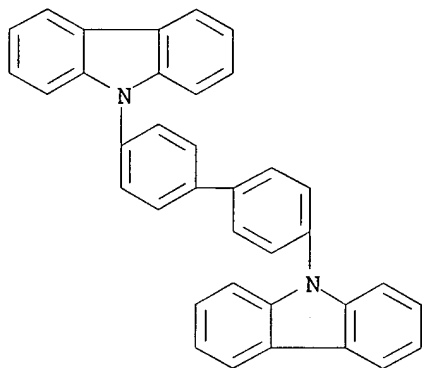
employing an In-Sn-oxide coated glass substrate directly as cathode and a semitransparent top Au thin film as anode. The structure contains an Ir-complex doped emissive layer sandwiched in between n- and p-doped charge transport layer with appropriate blocking layers to form a nip structure. The devices are .apprx.50% transparent and emit green light from both sides with peak external quantum efficiency (EQE) of 4.08% (14.3 cd/A). At 100 cd/m2, the EQE is 3.8% (13 cd/A) at an operating voltage of 4.3 V. The devices exhibit a lifetime of >50 h under continuous const.-current driving for the initial luminance of .apprx.9000 cd/m2 in vacuum, which project a lifetime of .apprx.5000 h for 100 cd/m2.

IT 58328-31-7, 4,4'-N,N'-Dicarbazolyl-biphenyl  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)

(4,4'-N,N'-dicarbazolyl-biphenyl-doped tris(2-(2-pyridinyl)phenyl)iridium; high-efficiency low-voltage stable inverted transparent electrophosphorescent org. LEDs contg.)

RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)

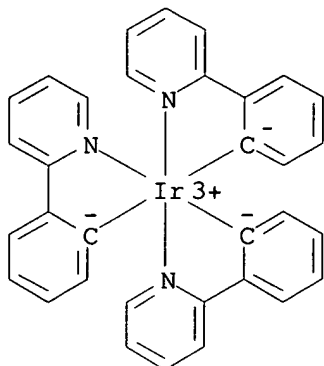


IT 94928-86-6

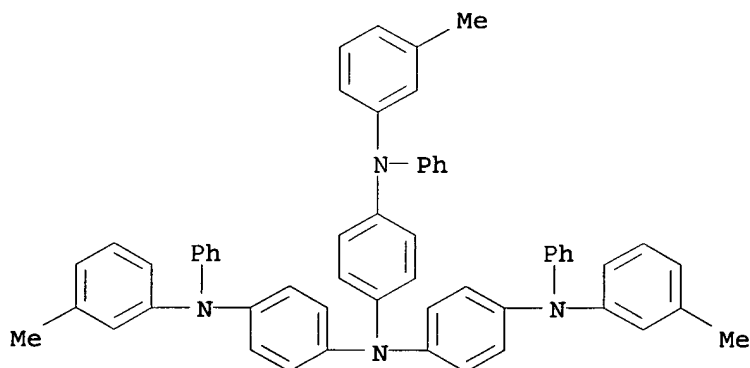
RL: DEV (Device component use); USES (Uses)  
(4,4'-N,N'-dicarbazolylbiphenyl-doped tris(2-(2-pyridinyl)phenyl)Ir; high-efficiency low-voltage stable inverted transparent electrophosphorescent org. LEDs combining elec. doped carrier transport layers and Ir-complex doped emissive layer)

RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI) (CA INDEX NAME)



IT 124729-98-2, MTDATA  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (MTDATA-doped tetrafluorotetracyanoquinodimethane;  
 high-efficiency low-voltage stable inverted transparent  
 electrophosphorescent org. LEDs contg.)  
 RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-  
 methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



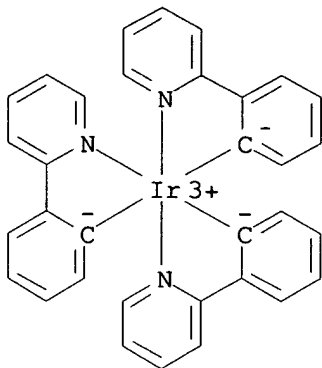
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related  
 Properties)  
 Section cross-reference(s): 76  
 IT 58328-31-7, 4,4'-N,N'-Dicarbazolyl-biphenyl  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (4,4'-N,N'-dicarbazolyl-biphenyl-doped tris(2-(2-  
 pyridinyl)phenyl)iridium; high-efficiency low-voltage stable  
 inverted transparent electrophosphorescent org. LEDs contg.)  
 IT 94928-86-6  
 RL: DEV (Device component use); USES (Uses)  
 (4,4'-N,N'-dicarbazolylbiphenyl-doped tris(2-(2-  
 pyridinyl)phenyl)Ir; high-efficiency low-voltage stable inverted  
 transparent electrophosphorescent org. LEDs combining elec. doped

carrier transport layers and Ir-complex doped emissive layer)  
IT 124729-98-2, MTDATA  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(MTDATA-doped tetrafluorotetracyanoquinodimethane;  
high-efficiency low-voltage stable inverted transparent  
electrophosphorescent org. LEDs contg.)  
REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

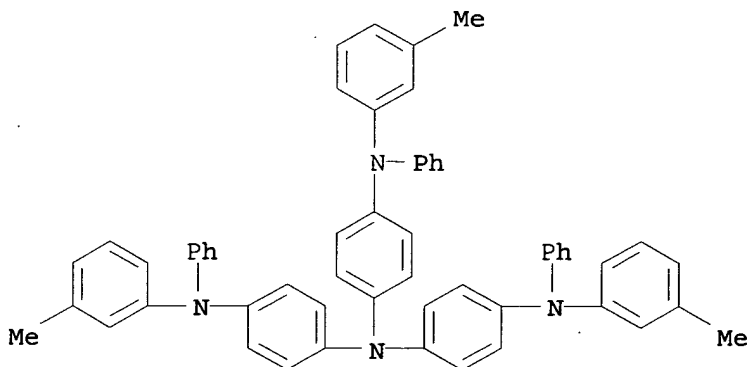
L11 ANSWER 12 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2003:240286 HCAPLUS  
DOCUMENT NUMBER: 138:245386  
TITLE: Heat-resistant organic electrophosphorescent  
device showing long service life  
INVENTOR(S): Fujikawa, Hisayoshi; Ikai, Masamichi; Taga,  
Yasunori; Nakagawa, Satoshi  
PATENT ASSIGNEE(S): Toyota Central Research and Development  
Laboratories, Inc., Japan; Toyoda Automatic Loom  
Works, Ltd.  
SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
JP 2003092186	A2	20030328	JP 2001-281147	200109 17
PRIORITY APPLN. INFO.:			JP 2001-281147	200109 17

OTHER SOURCE(S): MARPAT 138:245386  
AB The device comprises a light-emitting layer contg. a  
phosphorescence-emitting substance, and a hole-transporting layer  
contg. a compd. having  $\geq 3$  triphenylamine groups. The  
phosphorescence-emitting substance may be a carbazole compd., while  
the triphenylamine derivs. may have a bulky substituent, e.g.,  
naphthyl, tert-Bu, etc. The device inhibits unnecessary emission of  
light at the hole-transporting layer.  
IT 94928-86-6  
RL: DEV (Device component use); USES (Uses)  
(guest in phosphorescence-emitting layer; heat-resistant org.  
electrophosphorescent device contg. triphenylamine deriv. as  
hole-transporting layer)  
RN 94928-86-6 HCAPLUS  
CN Iridium, tris[2-(2-pyridinyl- $\kappa$ N)phenyl- $\kappa$ C]-, (OC-6-22)-  
(9CI) (CA INDEX NAME)

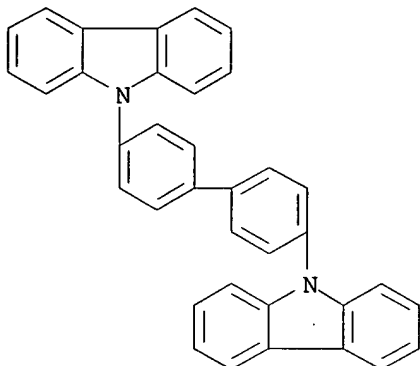


IT 124729-98-2, 4,4',4''-Tris(N-3-methylphenyl-N-phenyl-amino)triphenylamine  
 RL: DEV (Device component use); USES (Uses)  
 (hole-transporting material; heat-resistant org.  
 electrophosphorescent device contg. triphenylamine deriv. as  
 hole-transporting layer)  
 RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IT 58328-31-7  
 RL: DEV (Device component use); USES (Uses)  
 (host in phosphorescence-emitting layer; heat-resistant org.  
 electrophosphorescent device contg. triphenylamine deriv. as  
 hole-transporting layer)  
 RN 58328-31-7 HCAPLUS  
 CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)





IC ICM H05B033-22  
ICS C09K011-06; H05B033-14

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 25

IT 94928-86-6  
RL: DEV (Device component use); USES (Uses)  
(guest in phosphorescence-emitting layer; heat-resistant org. electrophosphorescent device contg. triphenylamine deriv. as hole-transporting layer)

IT 124729-98-2, 4,4',4''-Tris(N-3-methylphenyl-N-phenyl-amino)triphenylamine 167218-46-4 185690-39-5,  
4,4'-4''-Tris[N-(1-naphthyl)-N-phenyl-amino]triphenylamine 292827-46-4  
RL: DEV (Device component use); USES (Uses)  
(hole-transporting material; heat-resistant org. electrophosphorescent device contg. triphenylamine deriv. as hole-transporting layer)

IT 58328-31-7 160780-82-5, 1,3,5-Tris[4-(N-carbazolyl)phenyl]benzene  
RL: DEV (Device component use); USES (Uses)  
(host in phosphorescence-emitting layer; heat-resistant org. electrophosphorescent device contg. triphenylamine deriv. as hole-transporting layer)

L11 ANSWER 13 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:203080 HCAPLUS

DOCUMENT NUMBER: 138:229369

TITLE: Light emitting device and manufacturing method thereof

INVENTOR(S): Konuma, Toshimitsu

PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan

SOURCE: U.S. Pat. Appl. Publ., 32 pp.  
CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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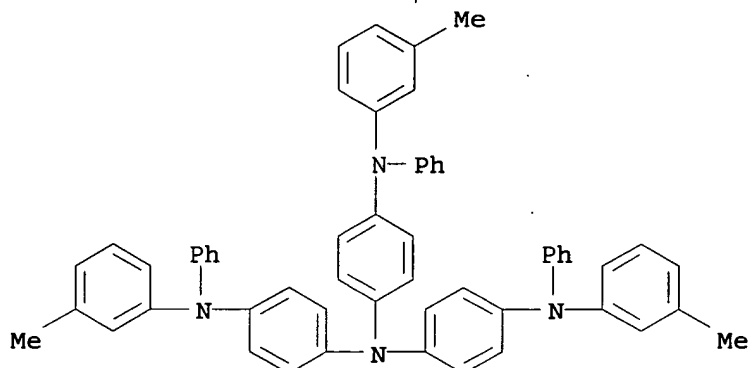
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US 2003047730	A1	20030313	US 2002-238218	200209 10
US 6905907	B2	20050614		
JP 2003084683	A2	20030319	JP 2001-274037	200109 10
PRIORITY APPLN. INFO.:			JP 2001-274037	A 200109 10

AB A method of fabricating a light emitting device is described entailing forming a thin film transistor over a substrate; forming an insulating layer over the thin film transistor; forming a wiring over the insulating layer; forming a conductor, which is elec. connected to the thin film transistor by the wiring, over the insulating layer; forming an insulating film over the conductor; polishing the conductor and the insulating film by a chem. mech. polishing method, thus forming a first electrode and a leveled insulating layer; forming an org. compd. layer contacting the first electrode; and forming a second electrode contacting the org. compd. layer; wherein the first electrode and the leveled insulating film formed by the chem. mech. polishing method form the same plane. The film formation irregularities in the org. compd. layer formed on the electrode can thus be prevented, and elec. field concn. from the edge portions of the electrode can be prevented. A light emitting device is also described comprising a first electrode having an edge portion; a leveled insulating film formed contacting the edge portion of the first electrode; an org. compd. layer adjacent to the first electrode; and a second electrode adjacent to the leveled insulating layer and the org. compd. layer; wherein surfaces of the first electrode and the leveled insulating layer are coplanar.

IT 124729-98-2, 4,4',4''-Tris (3-methyl-phenylphenylamino) triphenylamine  
 RL: DEV (Device component use); USES (Uses)  
 (hole transport layer; light emitting device having polished electrode surface and fabrication method)

RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)

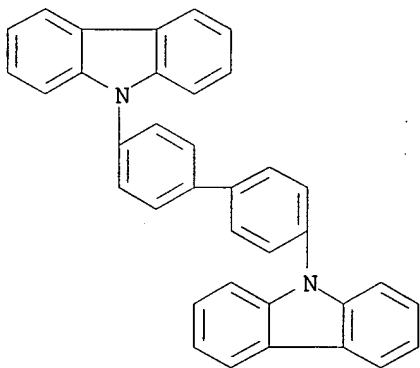


IT 58328-31-7 94928-86-6

RL: DEV (Device component use); USES (Uses)  
(light emitting layer; light emitting device having polished  
electrode surface and fabrication method)

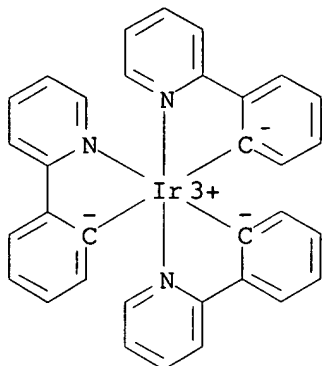
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
NAME)



RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
(9CI) (CA INDEX NAME)



IC ICM H01L029-18  
 INCL 257042000  
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 73, 76  
 IT 123847-85-8,  $\alpha$ -NPD 124729-98-2, 4,4',4''-Tris (3-methyl-phenylphenylamino) triphenylamine  
 RL: DEV (Device component use); USES (Uses)  
 (hole transport layer; light emitting device having polished electrode surface and fabrication method)  
 IT 58328-31-7 94928-86-6  
 RL: DEV (Device component use); USES (Uses)  
 (light emitting layer; light emitting device having polished electrode surface and fabrication method)  
 REFERENCE COUNT: 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L11 ANSWER 14 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2003:173080 HCAPLUS  
 DOCUMENT NUMBER: 138:212610  
 TITLE: Multicolor light emission apparatus and manufacturing method thereof  
 INVENTOR(S): Suzuri, Yoshiyuki; Genda, Kazuo; Kita, Hiroshi  
 PATENT ASSIGNEE(S): Konica Corporation, Japan  
 SOURCE: Eur. Pat. Appl., 46 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1289015	A2	20030305	EP 2002-18281	20020822

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK

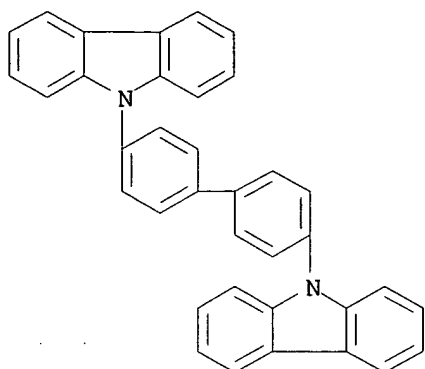
US 2003076032	A1	20030424	US 2002-225859	200208 22
US 6949878	B2	20050927		
JP 2003151769	A2	20030523	JP 2002-241871	200208 22
PRIORITY APPLN. INFO.:			JP 2001-257720	A 200108 28

AB Multicolored light-emitting app. comprising a first org. electroluminescent element having a first max. emission wavelength in a blue light wavelength region; and a second org. electroluminescent element having a second max. emission wavelength longer than the first max. emission wavelength are described in which the first org. electroluminescent element comprises a first light emission layer contg. a first host and a first dopant, and the second org. electroluminescent element comprises a second light emission layer contg. a second host and a second dopant, and each of the first and second hosts has an emission wavelength region which is shorter than the blue light wavelength region. Preferably, the first org. electroluminescent element comprises a first light emission layer contg. a first host and a first dopant, a first hole transporting layer contg. a first compd., which is provided adjacent to one side of the first light emission layer, and a first electron transporting layer contg. a second compd., which is provided adjacent to another side of the first light emission layer, and the second org. electroluminescent element comprises a second light emission layer contg. a second host and a second dopant, a second hole transporting layer contg. a third compd., which is provided adjacent to one side of the second light emission layer, and a second electron transporting layer contg. a fourth compd., which is provided adjacent to another side of the second light emission layer, and the max. emission wavelength of the first and second hosts is  $\leq 415$  nm, the max. emission wavelength of the first compd. and the max. emission wavelength of the third compd. are  $\leq 415$  nm and are the same, and the max. emission wavelength of the second compd. and the max. emission wavelength of the fourth compd. are  $\leq 415$  nm and are the same. Methods for fabricating the elements are described which entail simultaneously forming the hole transporting layer of each of the org. electroluminescent elements, sep. forming the light emission layer of each of the org. electroluminescent elements, and simultaneously forming the electron transporting layer or the hole blocking layer of each of the org. electroluminescent elements. Use of the elements in displays and as light sources for copiers and printers is indicated.

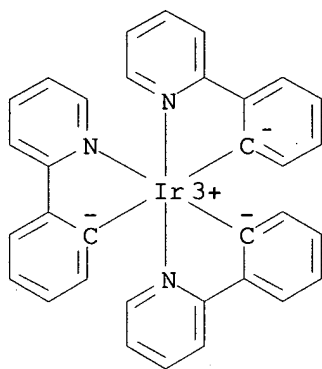
IT 58328-31-7 94928-86-6 124729-98-2,  
MTDATA  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(multicolor multielement light-emitting devices and their fabrication)

RN 58328-31-7 HCAPLUS

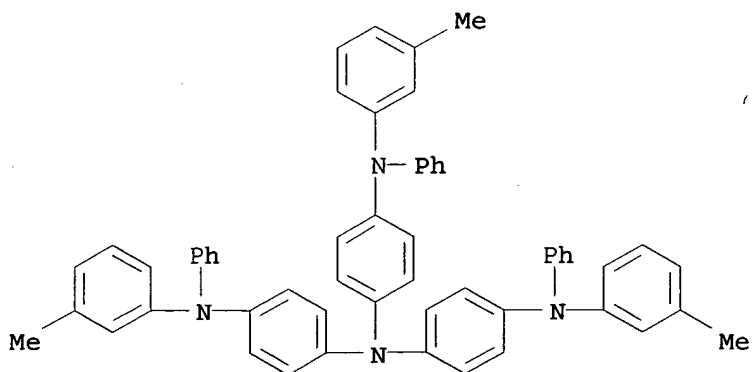
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L027-00  
ICS H01L051-30  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 74, 76  
IT 1450-63-1, TPB 2085-33-8, Tris(8-hydroxyquinolinato)aluminum  
4733-39-5, Bathocuproine 51325-95-2, DCM II 58328-31-7  
65181-79-5 94928-86-6 123847-85-8,  $\alpha$ -NPD  
124729-98-2, MTDATA 142289-08-5, DPVBi 144810-07-1  
148896-39-3 343978-79-0 376367-93-0 405171-87-1 405173-85-5  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(multicolor multielement light-emitting devices and their fabrication)

L11 ANSWER 15 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2002:754786 HCAPLUS  
DOCUMENT NUMBER: 137:270943  
TITLE: Deposition apparatus and method for manufg. an org. luminescent element which requires a lower drive voltage and has a longer life  
INVENTOR(S): Yamazaki, Shunpei; Seo, Satoshi; Mizukami, Mayumi  
PATENT ASSIGNEE(S): Japan  
SOURCE: U.S. Pat. Appl. Publ., 42 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
US 2002139303	A1	20021003	US 2002-62005	20020131
CN 1369573	A	20020918	CN 2002-103325	20020131
JP 2002302757	A2	20021018	JP 2002-22741	20020131
TW 552650	B	20030911	TW 2002-91101696	20020131
PRIORITY APPLN. INFO.:			JP 2001-26184	A 20010201

AB A deposition app. is provided for manufg. an org. compd. layer having a plurality of function regions. The deposition app. includes a plurality of evapn. sources within a deposition chamber, for enabling continuous formation of resp. function regions comprised of org. compds. and, further, formation of a mixed region

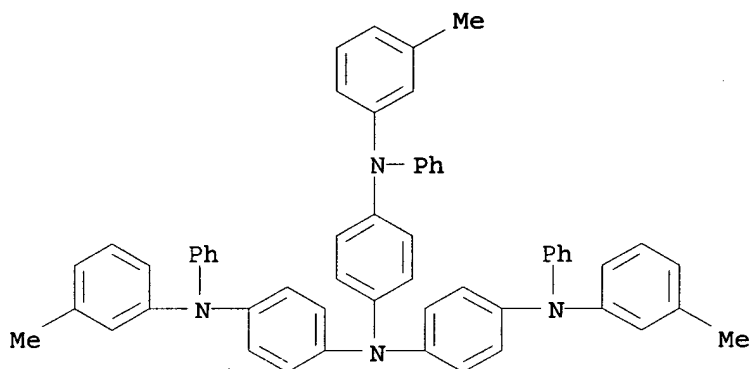
at an interface between adjacent ones of the function regions. With the deposition app. having such fabrication chamber, it is possible to prevent impurity contamination between the functions regions and further possible to form an org. compd. layer with an energy gap relaxed at the interface.

IT 124729-98-2, MTDATA

RL: DEV (Device component use); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(hole transportability; deposition app. and method for manufg. luminescent element having plurality of function regions)

RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)

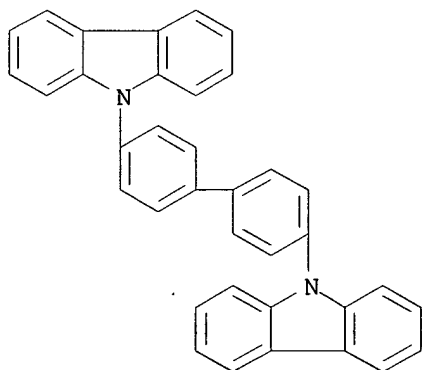


IT 58328-31-7

RL: DEV (Device component use); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(host; deposition app. and method for manufg. luminescent element having plurality of function regions)

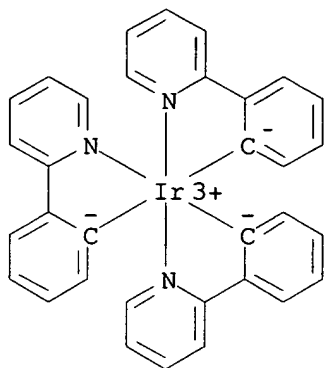
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)





IT 94928-86-6, Tris (2-phenylpyridine)iridium  
 RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
 (Physical, engineering or chemical process); PYP (Physical process);  
 FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
 (luminescent ability; deposition app. and method for manufg.  
 luminescent element having plurality of function regions)  
 RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) -  
 (9CI) (CA INDEX NAME)



IC ICM C23C016-00  
 ICS B05D005-06  
 INCL 118719000  
 CC 75-1 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 74  
 IT 147-14-8, Copper phthalocyanine 123847-85-8, 4,4'-Bis  
 [N-(1-naphthyl)-N-phenylamino]biphenyl 124729-98-2, MTDATA  
 RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
 (Physical, engineering or chemical process); PYP (Physical process);  
 FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
 (hole transportability; deposition app. and method for manufg.  
 luminescent element having plurality of function regions)  
 IT 58328-31-7  
 RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
 (Physical, engineering or chemical process); PYP (Physical process);  
 FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
 (host; deposition app. and method for manufg. luminescent element  
 having plurality of function regions)  
 IT 95-16-9D, Benzothiazole, derivs., complexes 273-53-0D,  
 Benzoxazole, derivs., complexes 31248-39-2, 2,3,7,8,12,13,17,18-Octaethyl-21H,23H-porphyrin-platinum 94928-86-6, Tris  
 (2-phenylpyridine)iridium  
 RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
 (Physical, engineering or chemical process); PYP (Physical process);  
 FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
 (luminescent ability; deposition app. and method for manufg.  
 luminescent element having plurality of function regions)

L11 ANSWER 16 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

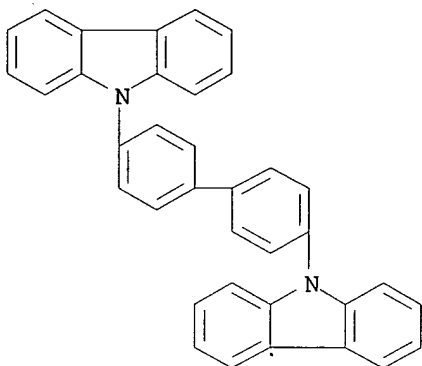
ACCESSION NUMBER: 2002:616081 HCAPLUS  
DOCUMENT NUMBER: 137:161254  
TITLE: Light emitting device and manufacturing method thereof  
INVENTOR(S): Seo, Satoshi; Yamazaki, Shunpei  
PATENT ASSIGNEE(S): Japan  
SOURCE: U.S. Pat. Appl. Publ., 41 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
US 2002109136	A1	20020815	US 2002-43812	200201 10
TW 519770	B	20030201	TW 2002-91100156	200201 08
JP 2002319492	A2	20021031	JP 2002-10748	200201 18
PRIORITY APPLN. INFO.:			JP 2001-10887	A 200101 18

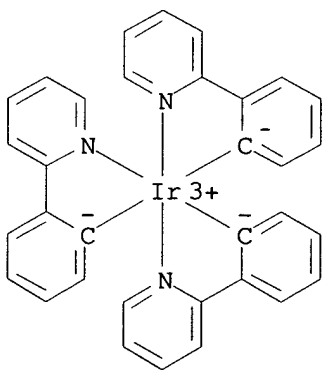
AB A org. light emitting device is described comprising an anode; a cathode; and an org. compd. film sandwiched between the anode and the cathode, wherein the org. compd. film comprises at least two compds. selected from the group consisting of a hole injecting compd. that receives holes from the anode; a hole transporting compd. that has a hole mobility that is larger than its electron mobility; an electron transporting compd. that has an electron mobility that is larger than its hole mobility; an electron injecting compd. that receives electrons from the cathode; and a blocking compd. capable of stopping the movement of holes or electrons, wherein the two compds. selected are materials capable of undergoing vacuum evapn., wherein the org. compd. film comprises a region in which the two compds. are mixed, and wherein the elec. current vs. elec. voltage property of the org. light emitting elements show a rectification property, wherein the org. compd. film comprises a region in which the first and the second org. compd. are mixed, wherein the concn. of the two compds. change within the region, or wherein the org. compd. film comprises a region in which the concn. of the first and the second org. compd. continuously changes. A method of fabricating the light emitting device is also described entailing providing a substrate comprising an electrode; making a vacuum chamber comprising at least first and second org. compd. evapn. sources in a reduced pressure state by reducing the pressure within the vacuum chamber to be equal to or less than 10<sup>-3</sup> Pa; and performing evapn. of the first org. compd. in the first org. compd. evapn. source and a second org. compd. contained in the second org. compd. evapn. source on the substrate while a pump for

reducing the pressure within the vacuum chamber is operated. wherein each of the first and second org. compd. evapn. sources comprises a container comprising an org. compd., and wherein the second org. compd. is evapd. next after the first org. compd. is evapd., under a state in which the first org. compd. evapn. source is not heated and in which an atm. of the first org. compd. remains within the vacuum chamber.

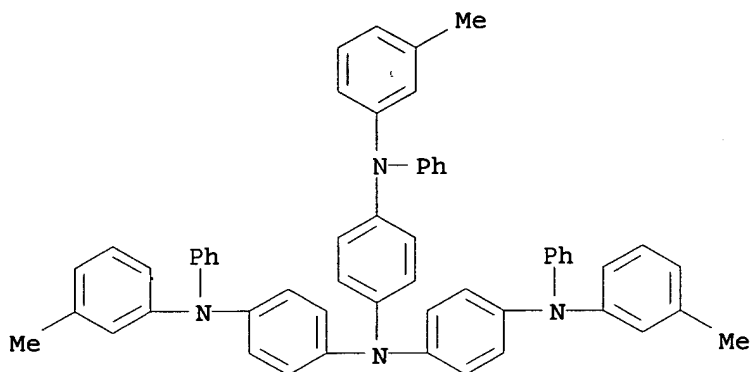
IT 58328-31-7 94928-86-6, Tris(2-phenylpyridine)iridium 124729-98-2  
 RL: DEV (Device component use); USES (Uses)  
 (light emitting device and fabrication method)  
 RN 58328-31-7 HCAPLUS  
 CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L035-24  
 INCL 257040000  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 76  
 IT 119-91-5D, Cuproin, vaso-derivs. 147-14-8, Copper phthalocyanine  
 2085-33-8, AlQ3 4733-39-5, BCP 7429-90-5, Aluminum, uses  
 7439-88-5, Iridium, uses 7440-06-4, Platinum, uses 7440-41-7,  
 Beryllium, uses 7440-66-6, Zinc, uses 14752-00-2, Aluminum  
 Tris(4-methyl-8-quinolinolate) 15082-28-7, 2-(4-Biphenyl)-5-(4-  
 tert-butylphenyl)-1,3,4-oxadiazole 31248-39-2,  
 (2,3,7,8,12,13,17,18-Octaethyl-21H-23H-porphyrin)platinum  
 58328-31-7 65181-78-4, 4,4'-Bis[N-(3-methylphenyl)-N-  
 phenyl-amino]-biphenyl 94928-86-6, Tris(2-  
 phenylpyridine)iridium 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-  
 phenyl-amino]-biphenyl 124729-98-2 138372-67-5  
 148896-39-3 149005-33-4 150405-69-9 163226-12-8  
 RL: DEV (Device component use); USES (Uses)  
 (light emitting device and fabrication method)

L11 ANSWER 17 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2002:505143 HCAPLUS  
 DOCUMENT NUMBER: 137:70377  
 TITLE: Light emitting device and method of  
 manufacturing the same  
 INVENTOR(S): Yamazaki, Shunpei; Mizukami, Mayumi; Arai,  
 Yasuyuki  
 PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 24 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002084464	A1	20020704	US 2001-12369	200112 12

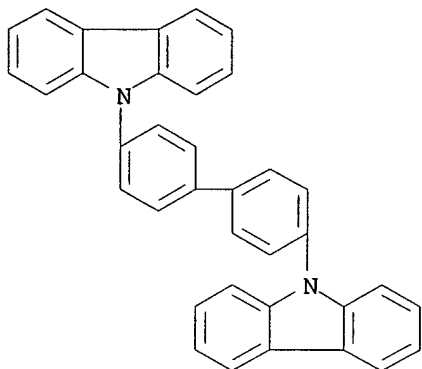
US 6646284	B2	20031111		
JP 2002246183	A2	20020830	JP 2001-379294	200112 12
US 2004075112	A1	20040422	US 2003-682440	200310 10
US 6803246	B2	20041012		
JP 2005101015	A2	20050414	JP 2005-4937	200501 12
PRIORITY APPLN. INFO.:			JP 2000-378197	A 200012 12
			JP 2001-379294	A3 200112 12
			US 2001-12369	A3 200112 12

AB Methods of manufg. org. light-emitting devices are described which entail performing selected thermal treatments on the org. compd. layer after sealing the org. compd. layer in a closed space provided with a drying agent (e.g., BaO) and/or filling the closed space with  $\geq 1$  gas selected from nitrogen, helium, argon, krypton, and neon. Preferably, the concn. of oxygen and moisture in the closed space is  $\leq 2$  ppm. Several configuration of light-emitting devices suitable for manuf. using the methods are also described, as are a variety of devices employing the light-emitting devices.

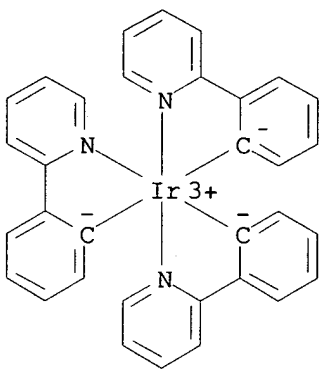
IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl  
94928-86-6, Tris-(2-phenylpyridine)iridium  
124729-98-2, 4,4',4''-Tris(N-3-methylphenyl-N-phenylamino)triphenylamine  
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(org. light-emitting device fabrication with org. layers in closed spaces for environmental factor control and the devices and devices using them)

RN 58328-31-7 HCAPLUS

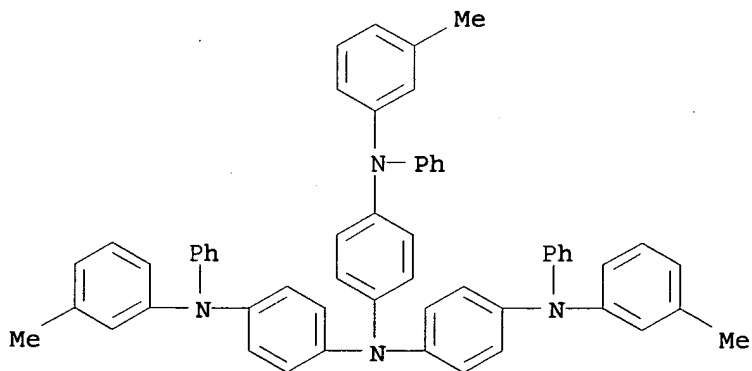
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) -  
 (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L033-00  
 INCL 257089000  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 74, 76  
 IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 4733-39-5, Bathocuproine 7440-64-4, Ytterbium, uses 50926-11-9, Indium tin oxide 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl 94928-86-6, Tris-(2-phenylpyridine)iridium 123847-85-8 124729-98-2, 4,4',4''-Tris(N-3-methylphenyl-N-phenylamino)triphenylamine 126213-51-2, Polyethylenedioxythiophene  
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
 (org. light-emitting device fabrication with org. layers in closed spaces for environmental factor control and the devices and devices using them)

L11 ANSWER 18 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2002:503506 HCAPLUS  
 DOCUMENT NUMBER: 137:70360  
 TITLE: Organic electroluminescent devices using mixed layers  
 INVENTOR(S): Seo, Satoshi; Yamazaki, Shunpei  
 PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan  
 SOURCE: Eur. Pat. Appl., 67 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 1220340	A2	20020703	EP 2001-130872	200112 27
EP 1220340	A3	20060118		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
SG 115435	A1	20051028	SG 2001-7840	200112 19
US 2002086180	A1	20020704	US 2001-26064	200112 21
TW 543342	B	20030721	TW 2001-90132573	200112 27
CN 1362746	A	20020807	CN 2001-130273	200112 28
JP 2002313583	A2	20021025	JP 2001-399072	200112

CN 1551697	A	20041201	CN 2004-10063290	28
				200112
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US 2005260440	A1	20051124	US 2003-623609	200307
				22
PRIORITY APPLN. INFO.:			JP 2000-400953	A
				200012
				28
			JP 2001-20817	A
				200101
				29
			JP 2001-32406	A
				200102
				08
			US 2001-26064	A3
				200112
				21

AB Org. electroluminescent devices are described in which  $\geq 1$  of the layers making up the devices comprises a mixt. of materials having desired properties. The layers may include a hole transporting mixed layer comprising a hole injecting material and a hole transporting material, a mixed layer comprising a hole transporting material and an electron transporting material, or an electron transporting mixed layer comprising an electron transporting material 813 and an electron injecting material. The mixed layers may be compositionally graded.

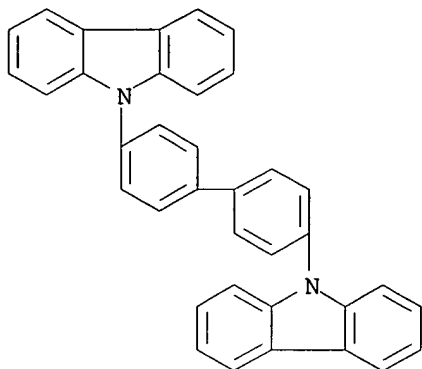
IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl  
94928-86-6, Tris(2-phenylpyridine)iridium  
124729-98-2, 4,4',4''-Tris[N-(3-methylphenyl)-N-phenylamino]triphenylamine

RL: DEV (Device component use); USES (Uses)  
(org. electroluminescent devices using mixed layers)

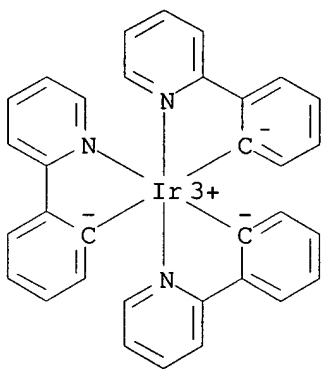
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)

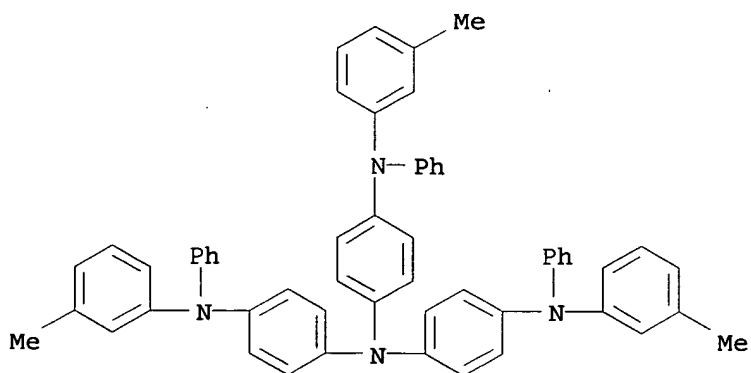




RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L051-20  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 76  
 IT 147-14-8, Copper phthalocyanine 1662-01-7, Bathophenanthroline 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 7789-24-4, Lithium fluoride, uses 15082-28-7, 2-(4-Biphenyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole 18115-70-3, Lithium acetylacetonate, uses 50926-11-9, Indium tin oxide 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl 91650-87-2 94928-86-6, Tris(2-phenylpyridine)iridium 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 124729-98-2, 4,4',4''-Tris[N-(3-methylphenyl)-N-phenylamino]triphenylamine 146162-54-1 148896-39-3, Bis(10-hydroxybenzo[h]quinolinato)beryllium  
 RL: DEV (Device component use); USES (Uses)  
 (org. electroluminescent devices using mixed layers)

L11 ANSWER 19 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:503505 HCAPLUS

DOCUMENT NUMBER: 137:70359

TITLE: Organic light-emitting devices containing a region or a mixed layer provided for lowering energy barriers at interfaces between the organic layers, and electronic devices employing the light-emitting devices

INVENTOR(S): Seo, Satoshi; Yamazaki, Shunpei

PATENT ASSIGNEE(S): SEL Semiconductor Energy Laboratory Co., Ltd., Japan

SOURCE: Eur. Pat. Appl., 78 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1220339	A2	20020703	EP 2001-130487	20011220
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
TW 545080	B	20030801	TW 2001-90131393	20011218
SG 93298	A1	20021217	SG 2001-7839	20011219
US 2002121860	A1	20020905	US 2001-24699	20011221
JP 2002324680	A2	20021108	JP 2001-395213	20011226
CN 1362747	A	20020807	CN 2001-130274	

PRIORITY APPLN. INFO.: JP 2000-400730 A 200112  
28

JP 2001-45847 A 200012  
28

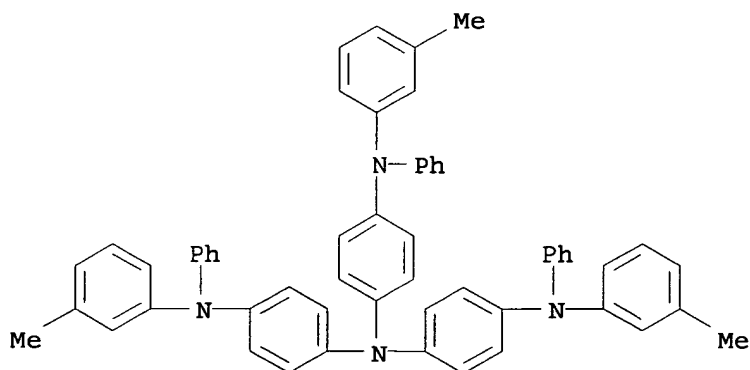
200102  
21

AB Light emitting devices are described which comprise at least a first layer comprising a first org. compd.; and a second layer comprising a second org. compd. which is different from the first org. compd., where a region or a mixed layer comprising the first org. compd. and the second org. compd. between the first layer and the second layer is provided for lowering energy barriers at interfaces between the org. layers. The devices may contain hole-injecting, hole-transporting, electron-transporting, electron-injecting and light-emitting layers as org. compd. layers, and may have more than one regions or mixed layers. Electronic devices employing the light-emitting devices are also discussed.

IT 124729-98-2, 4,4',4''-Tris [N-(3-methylphenyl)-N-phenylamino]triphenylamine  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(hole-transporting layer; fabrication of light-emitting devices contg. mixed layer lowering energy barriers at interfaces between org. layers and contg.)

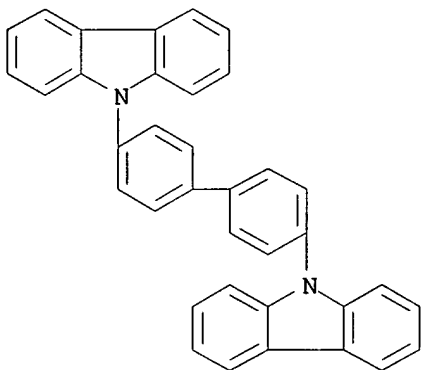
RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)

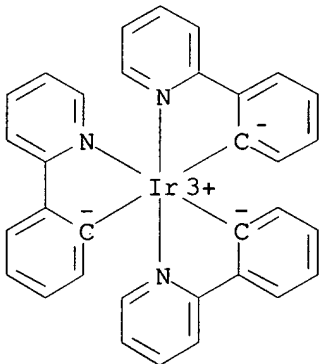


IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl  
RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(light-emitting layer dopant; fabrication of light-emitting devices contg. mixed layer lowering energy barriers at interfaces between org. layers and contg.)

RN 58328-31-7 HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



IT 94928-86-6, Tris (2-phenylpyridine) iridium  
RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(light-emitting material; fabrication of light-emitting devices contg. mixed layer lowering energy barriers at interfaces between org. layers and contg.)  
RN 94928-86-6 HCAPLUS  
CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) - (9CI) (CA INDEX NAME)



IC ICM H01L051-20  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 74, 76  
IT 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl  
124729-98-2, 4,4',4'''-Tris [N-(3-methylphenyl)-N-phenylamino]triphenylamine  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES

(Uses)

(hole-transporting layer; fabrication of light-emitting devices  
contg. mixed layer lowering energy barriers at interfaces between  
org. layers and contg.)

IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl

RL: DEV (Device component use); MOA (Modifier or additive use); PEP  
(Physical, engineering or chemical process); PYP (Physical process);  
PROC (Process); USES (Uses)

(light-emitting layer dopant; fabrication of light-emitting  
devices contg. mixed layer lowering energy barriers at interfaces  
between org. layers and contg.)

IT 51325-91-8, 4-(Dicyanomethylene)-2-methyl-6-(p-dimethylaminostyryl)-  
4H-pyran 94928-86-6, Tris (2-phenylpyridine) iridium

RL: DEV (Device component use); MOA (Modifier or additive use); PEP  
(Physical, engineering or chemical process); PYP (Physical process);  
PROC (Process); USES (Uses)

(light-emitting material; fabrication of light-emitting devices  
contg. mixed layer lowering energy barriers at interfaces between  
org. layers and contg.)

L11 ANSWER 20 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:487896 HCAPLUS

DOCUMENT NUMBER: 137:54413

TITLE: Highly efficient OLEDs using doped ambipolar  
conductive molecular organic thin films  
INVENTOR(S): Adachi, Chihaya; Baldo, Marc A.; Forrest,  
Stephen R.

PATENT ASSIGNEE(S): The Trustees of Princeton University, USA

SOURCE: PCT Int. Appl., 26 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002051206	A2	20020627	WO 2001-US48235	20011214
WO 2002051206	A3	20030717		
W:				
AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW				
RW:				
GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
US 2002113545	A1	20020822	US 2000-740183	20001218
US 6573651	B2	20030603		

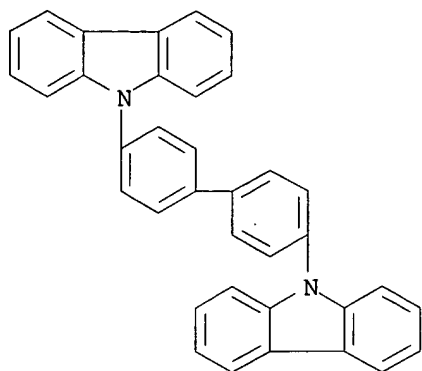
AU 2002029047	A5	20020701	AU 2002-29047	200112 14
TW 524027	B	20030311	TW 2001-90131215	200112 17
US 2003197467	A1	20031023	US 2003-452659	200305 30
US 6900588	B2	20050531		
PRIORITY APPLN. INFO.:			US 2000-740183	A 200012 18
			WO 2001-US48235	W 200112 14

AB An org. light emitting device is described comprising an anode layer comprising an anode material having a characteristic ionization potential; an org. hole injecting layer comprising an org. hole injecting material having a characteristic ionization potential, the org. hole injecting layer being in direct contact with the anode layer, wherein the ionization potential of the org. hole injecting material is not more than 0.7 eV greater than the ionization potential of the anode material; an org. electron transporting layer comprising an org. electron transporting material and an org. hole-trapping emissive material, the org. electron transporting layer being in direct contact with the org. hole injecting layer; and a cathode layer in direct contact with the org. electron transporting layer. An org. light emitting device is also described comprising an ITO anode layer; a hole injecting layer comprising 4,4',4"-tris(3-methylphenylphenylamino)triphenylamine, the hole injecting layer being in direct contact with the ITO anode layer; an emissive layer comprising 4,4'-N,N'-dicarbazole-biphenyl doped with fac tris(2-phenylpyridine)iridium, the emissive layer being in direct contact with the hole injecting layer; and a cathode layer comprising magnesium and silver, the cathode layer being in direct contact with the emissive layer.

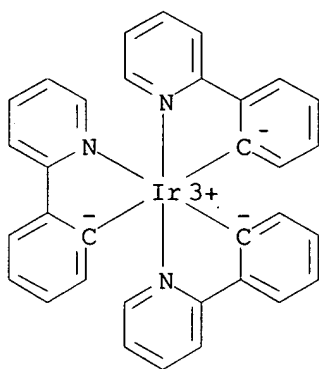
IT 58328-31-7 94928-86-6, Tris(2-phenylpyridine)iridium 124729-98-2, MTDATA  
 RL: DEV (Device component use); USES (Uses)  
 (highly efficient OLEDs using doped ambipolar conductive mol. org. thin films)

RN 58328-31-7 HCAPLUS

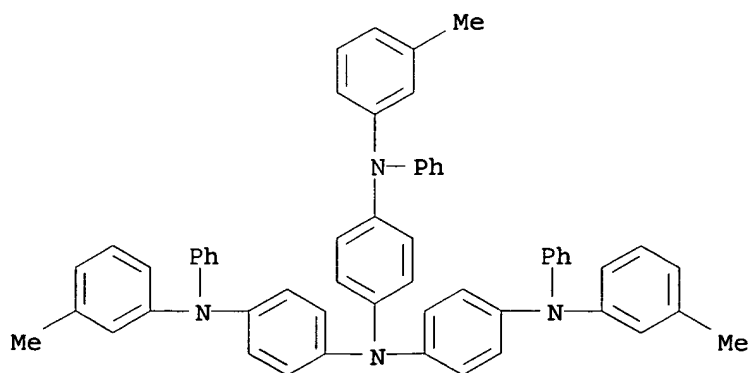
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H05B  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 41, 76  
IT 37271-44-6 50926-11-9, Indium tin oxide 58328-31-7  
94928-86-6, Tris(2-phenylpyridine)iridium  
124729-98-2, MTDATA  
RL: DEV (Device component use); USES (Uses)  
(highly efficient OLEDs using doped ambipolar conductive mol.  
org. thin films)

L11 ANSWER 21 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2002:450136 HCAPLUS  
DOCUMENT NUMBER: 137:25988  
TITLE: Light-emitting device and method of fabricating  
the same  
INVENTOR(S): Yamagata, Hirokazu  
PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan  
SOURCE: U.S. Pat. Appl. Publ., 27 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2002070385	A1	20020613	US 2001-11195	200112 07
US 6965124	B2	20051115		
JP 2002244590	A2	20020830	JP 2001-369146	200112 03
US 2005156179	A1	20050721	US 2005-60522	200502 17
PRIORITY APPLN. INFO.:			JP 2000-378096	A 200012 12
			US 2001-11195	A3 200112 07

AB A light-emitting device having a structure in which a mask used for forming a film such as an org. compd. layer does not come in contact with the pixels in forming the light-emitting elements is described comprising a TFT over a substrate; a light-emitting element over the substrate, the light-emitting element comprising a first electrode, an org. compd. layer and a second electrode; a first wiring elec. connected to the first electrode and provided over the substrate; an insulating film provided over the first wiring; and a second wiring formed over the first wiring and over the insulating film, the second wiring elec. connected to the TFT. A method of fabricating



the light-emitting device(e.g., active matrix type) is also described entailing, a partitioning wall constituted by a 2nd wiring and a sepn. portion is formed on the interlayer-insulating film, and the pixels are surrounded by the partitioning wall, preventing the mask from coming into direct contact with the pixels, the mask being used for forming the org. compd. layer and the opposing electrode of the light-emitting elements. Use of the light-emitting device in display device, digital camera, notebook computer, image reprodn. device, goggle-type display, video camera, telephone is indicated.

IT 58328-31-7 94928-86-6 124729-98-2,

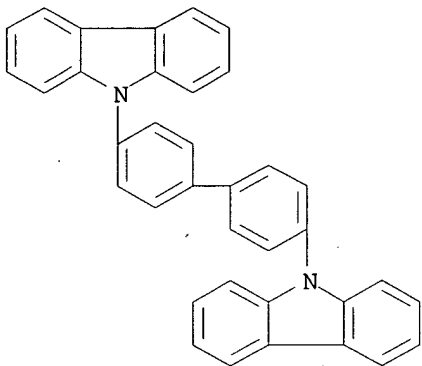
MTDATA

RL: DEV (Device component use); USES (Uses)

(light-emitting device and method of fabricating same)

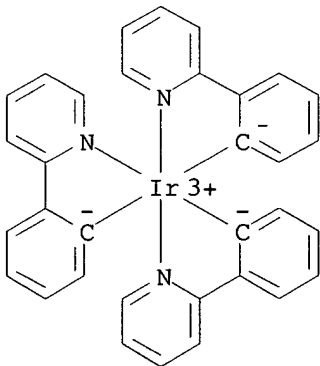
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



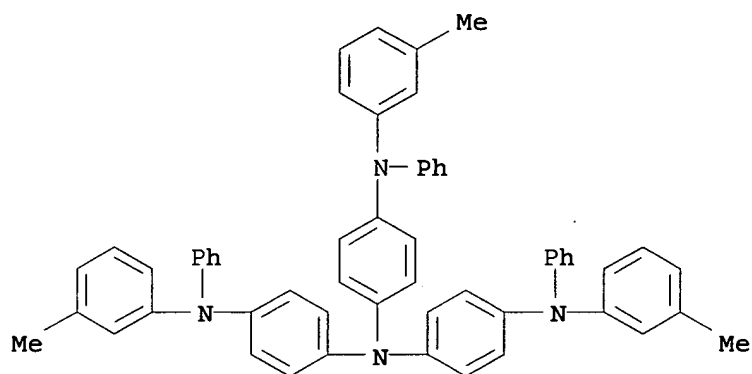
RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01L027-01  
ICS H01L021-00; H01L031-0392  
INCL 257093000  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 22, 74, 76  
IT 147-14-8, Copper phthalocyanine 2085-33-8, AlQ3 7631-86-9,  
Silicon oxide, uses 11105-01-4, Silicon oxynitride 12033-89-5,  
Silicon nitride, uses 51325-91-8, DCM 58328-31-7  
94928-86-6 124729-98-2, MTDATA  
RL: DEV (Device component use); USES (Uses)  
(light-emitting device and method of fabricating same)

L11 ANSWER 22 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2002:369872 HCAPLUS  
DOCUMENT NUMBER: 137:161079  
TITLE: Architectures for efficient electrophosphorescent organic light-emitting devices  
AUTHOR(S): Adachi, Chihaya; Thompson, Mark E.; Forrest, Stephen R.  
CORPORATE SOURCE: Center for Photonics and Optoelectronic Materials (POEM), Department of Electrical Engineering, Princeton University, Princeton, NJ, 08544, USA  
SOURCE: IEEE Journal of Selected Topics in Quantum Electronics (2002), 8(2), 372-377  
CODEN: IJSQEN; ISSN: 1077-260X  
PUBLISHER: Institute of Electrical and Electronics Engineers  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB Several device architectures leading to high-efficiency org. electrophosphorescent (EP) light emission are discussed. An external electroluminescence efficiency ( $\eta_{\text{ext}}$ ) of  $(10.0 \pm 0.5)\%$  was realized by doping fac-tris(2-phenylpyridine)iridium ( $\text{Ir}(\text{ppy})_3$ ) into a 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline (BCP) electron transport layer. Direct exciton formation on the phosphor dopant avoids exciplex formation at the interface of

unipolar hole and electron transport layers. Triplet exciton and carrier dynamics in a double heterostructure were studied to det. the location and width of the exciton formation zone. High-efficiency EP is also demonstrated in a simplified 2 layer architecture using a 4,4'-N,N'-dicarbazole-biphenyl (CBP) ambipolar carrier transport host.

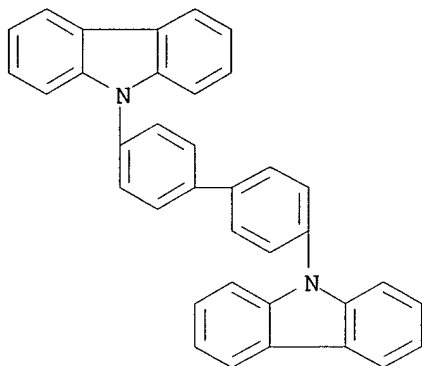
IT 58328-31-7 94928-86-6, fac-Tris(2-phenylpyridine)iridium 124729-98-2

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)

(architectures for efficient electrophosphorescent org. LEDs contg.)

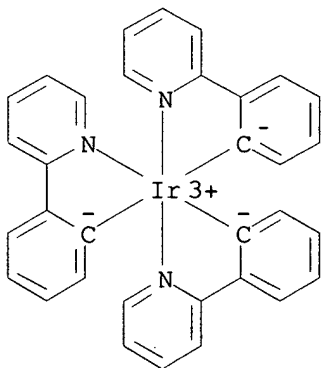
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



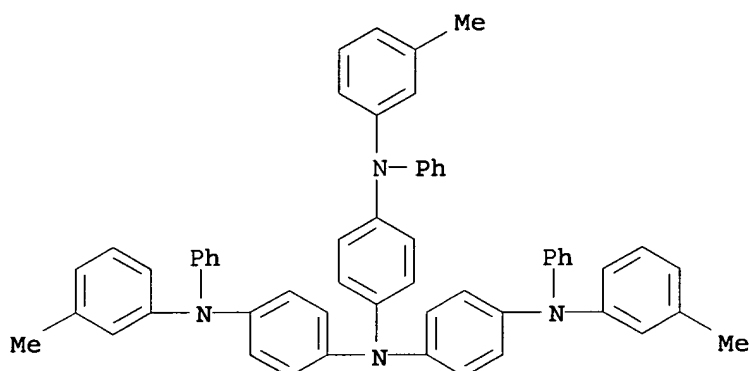
RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

IT 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 4733-39-5,  
2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline 58328-31-7  
94928-86-6, fac-Tris(2-phenylpyridine)iridium 123847-85-8,  
 $\alpha$ -NPD 124729-98-2 345655-82-5

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)

(architectures for efficient electrophosphorescent org. LEDs contg.)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L11 ANSWER 23 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:368871 HCAPLUS

DOCUMENT NUMBER: 136:393038

TITLE: Light emitting device and manufacturing method thereof

INVENTOR(S): Yamazaki, Shunpei; Arai, Yasuyuki

PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan

SOURCE: U.S. Pat. Appl. Publ., 24 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

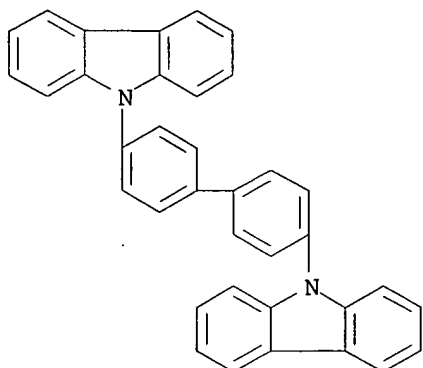
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002057055	A1	20020516	US 2001-982100	20011019
US 6664732	B2	20031216		
JP 2002203682	A2	20020719	JP 2001-327024	200110

US 2004113548	A1	20040617	US 2003-720476	24
				200311
				25
US 6897608	B2	20050524		
JP 2005100992	A2	20050414	JP 2004-305085	
				200410
				20
US 2005199874	A1	20050915	US 2005-127134	
				200505
				12
PRIORITY APPLN. INFO.:			JP 2000-326290	A
				200010
				26
			US 2001-982100	A3
				200110
				19
			JP 2001-327024	A3
				200110
				24
			US 2003-720476	A1
				200311
				25

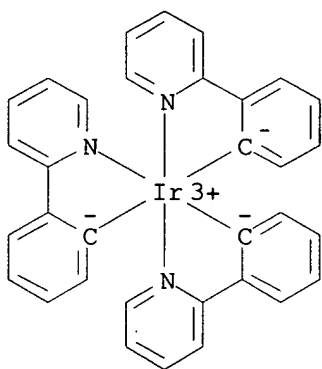
AB Org. light-emitting elements having  $\geq 1$  layer made from an org. compd. between a cathode and an anode are described in which the concn. of oxygen in the org. layer(s) is  $\leq 1 + 1019/\text{cm}^3$ . Methods of manufg. light-emitting devices are also described which entail forming a first insulating layer comprising a silicon nitride or a silicon oxynitride; forming an anode comprising an oxide conductive material over the first insulating layer; forming a second insulating layer covering edge portions of the anode; forming a layer comprising an org. compd. in contact with the anode and the second insulating layer; forming a cathode comprising an alk. metal in contact with the layer comprising an org. compd.; and forming a third insulating layer comprising a carbon over the cathode. Problems caused by oxygene, such as decreases in brightness and dark spots through degrdn. of electrode materials, are reduced relative to conventional devices.

IT 58328-31-7 94928-86-6 124729-98-2,  
4,4',4''-Tris(N-3-methylphenyl-N-phenylamino)triphenylamine  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(org. light-emitting devices with low oxygen contents in the org. layers and their manuf.)

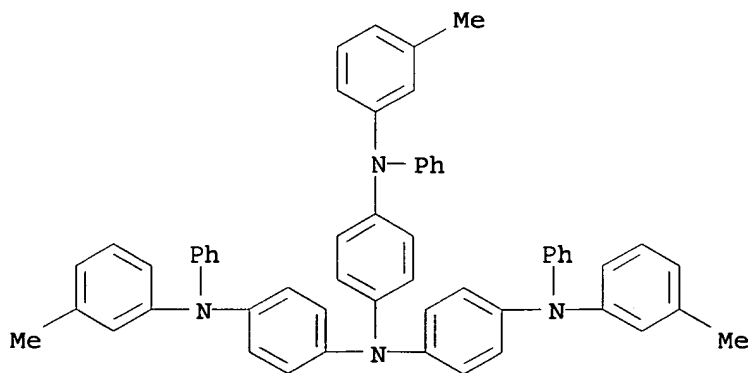
RN 58328-31-7 HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



RN 94928-86-6 HCAPLUS  
 CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)-  
 (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H01J001-62  
 INCL 313506000  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 76  
 IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 4733-39-5, Bathocuproine 7440-44-0, Carbon, uses 7440-64-4, Ytterbium, uses 7631-86-9, Silicon oxide, uses 11105-01-4, Silicon oxynitride 12033-89-5, Silicon nitride, uses 50926-11-9, ITO 58328-31-7 94928-86-6 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 124729-98-2, 4,4',4''-Tris(N-3-methylphenyl-N-phenylamino)triphenylamine 126213-51-2  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (org. light-emitting devices with low oxygen contents in the org. layers and their manuf.)

L11 ANSWER 24 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2002:332555 HCAPLUS  
 DOCUMENT NUMBER: 136:332912  
 TITLE: Light emitting device using triplet compound  
 INVENTOR(S): Yamazaki, Shunpei; Nishi, Takeshi; Mizukami, Mayumi; Ikeda, Hisao  
 PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 43 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002050786	A1	20020502	US 2001-938291	20010824
US 6864628	B2	20050308		
JP 2002151269	A2	20020524	JP 2001-256687	20010827
US 2005140280	A1	20050630	US 2005-45311	20050131
PRIORITY APPLN. INFO.:			JP 2000-258260	A 20000828
			US 2001-938291	A3 20010824

AB A light emitting device is described comprising a substrate having a pixel portion; and a plurality of EL elements in the pixel portion, at least one of the EL elements comprising an EL layer comprising a

triplet compd. (e.g., CBP and Ir(ppy)3), wherein the EL layer comprises a plurality of hole transporting layers contg. MTDATA and layers contg.  $\alpha$ -NPD, and a hole injection layer comprising copper phthalocyanine. The luminance of different colors of light emitted from EL elements in a pixel portion of a light emitting device is equalized and the luminance of light emitted from the EL elements is raised. A hole transporting layer has a laminate structure to thereby cause the EL elements to emit light of higher luminance. An elec. appliance (e.g, video camera, imaging device, recording medium, personal computer, cellular phone, audio reproducing device) having a light emitting device is also described comprising a substrate having a pixel portion; and a plurality of EL elements in the pixel portion, at least one of the EL elements comprising an EL layer comprising a triplet compd., wherein the EL layer comprises a plurality of hole transporting layers.

IT 58328-31-7, 4,4'-Bis(carbazol-9-yl)biphenyl

94928-86-6, Tris(2-phenylpyridine)iridium

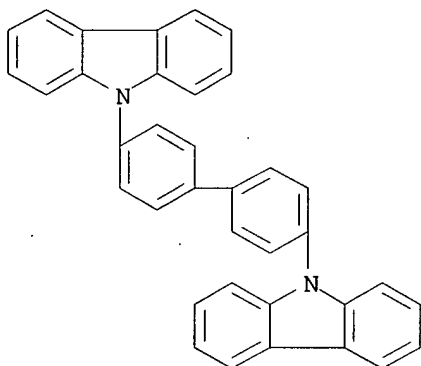
124729-98-2, MTDATA

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(light emitting device using triplet compd.)

RN 58328-31-7 HCAPLUS

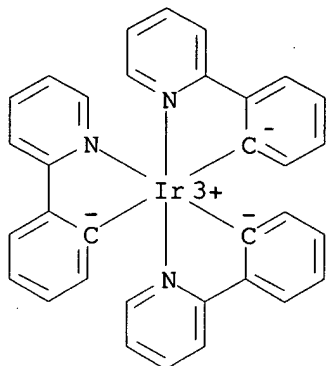
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



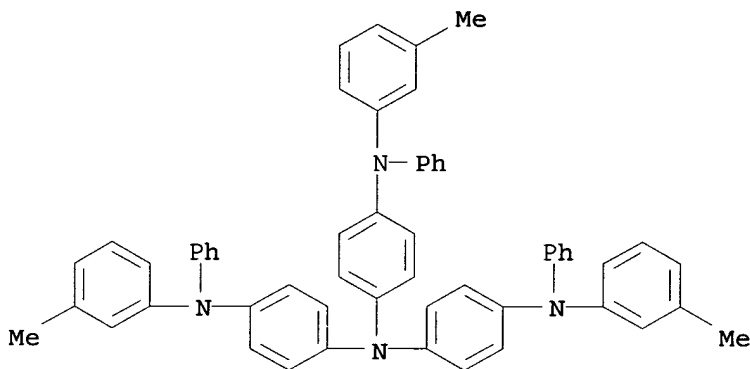
RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl- $\kappa$ N)phenyl- $\kappa$ C]-, (OC-6-22)- (9CI) (CA INDEX NAME)





RN 124729-98-2 HCAPLUS  
 CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM H05B033-14  
 INCL 313504000  
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 73, 76  
 IT 147-14-8, Copper phthalocyanine 1314-13-2, Zinc oxide (ZnO), processes 2085-33-8, AlQ3 7440-21-3, Silicon, processes 7440-33-7, Tungsten, processes 7631-86-9, Silicon oxide, processes 11105-01-4, Silicon oxynitride 12024-08-7, Gallium oxide (GaO) 12033-62-4, Tantalum nitride 26009-24-5, Poly(1,4-phenylene-1,2-ethenediyl) 58328-31-7, 4,4'-Bis(carbazol-9-yl)biphenyl 94928-86-6, Tris(2-phenylpyridine)iridium 123847-85-8, α-NPD 124729-98-2, MTDATA 126213-51-2, PEDOT  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
 (light emitting device using triplet compd.)  
 REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L11 ANSWER 25 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2001:885601 HCAPLUS  
 DOCUMENT NUMBER: 136:29042  
 TITLE: Light emitting device and electrical appliance  
 INVENTOR(S): Yamazaki, Shunpei; Inukai, Kazutaka  
 PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Japan  
 SOURCE: Eur. Pat. Appl., 36 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1160889	A2	20011205	EP 2001-112477	20010522
EP 1160889	A3	20060104		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
TW 536836	B	20030611	TW 2001-90110575	20010503
US 2001050373	A1	20011213	US 2001-862680	20010521
US 6677621	B2	20040113		
CN 1325143	A	20011205	CN 2001-119502	20010522
JP 2002050484	A2	20020215	JP 2001-153113	20010522
US 2004173811	A1	20040909	US 2004-754701	20040112
PRIORITY APPLN. INFO.:			JP 2000-150484	A
				20000522
			US 2001-862680	A3
				20010521

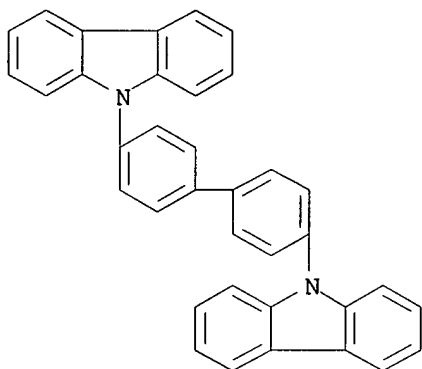
AB Light-emitting devices are described which comprise an electroluminescent element using a luminescent material in which electroluminescence is obtained by triplet excitation; and a semiconductor component (e.g., a thin-film transistor) elec. connected to the electroluminescent element. Elec. appliances using the devices (in, e.g., displays) are also described.

IT 58328-31-7 94928-86-6, Tris-(2-phenylpyridine)iridium 124729-98-2, 4,4',4''-Tris(N-3-methylphenyl-N-phenylamino)triphenylamine

RL: DEV (Device component use); USES (Uses)  
(light-emitting devices using triplet emitters and elec.  
appliances using them)

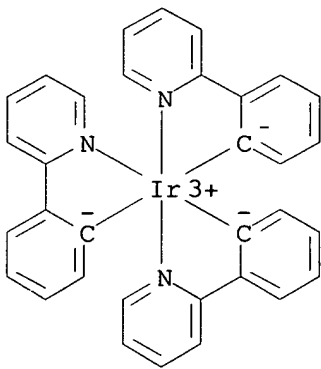
RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



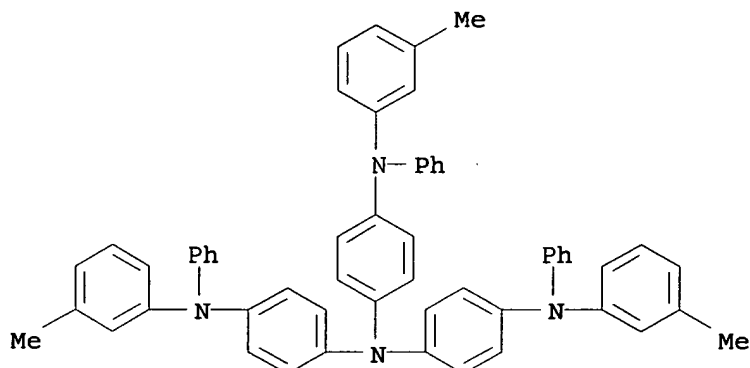
RN 94928-86-6 HCAPLUS

CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS

CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



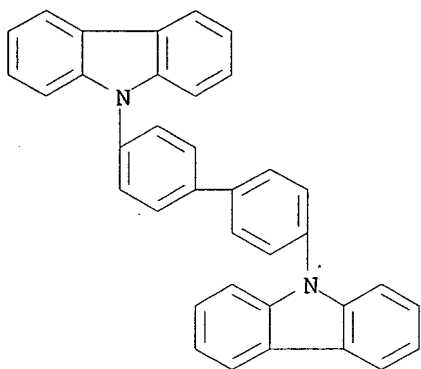
IC ICM H01L051-20  
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 74, 76  
 IT 91-22-5D, Quinoline, compds. with transition metals 147-14-8,  
 Copper phthalocyanine 2085-33-8, Tris(8-hydroxyquinolino)aluminum 4733-39-5, Bathocuproine 50926-11-9,  
 ITO 58328-31-7 94928-86-6, Tris-(2-phenylpyridine)iridium 123847-85-8 124729-98-2,  
 4,4',4''-Tris(N-3-methylphenyl-N-phenylamino)triphenylamine  
 377730-15-9 377730-17-1 377730-18-2  
 RL: DEV (Device component use); USES (Uses)  
 (light-emitting devices using triplet emitters and elec. appliances using them)

L11 ANSWER 26 OF 26 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2001:536049 HCAPLUS  
 DOCUMENT NUMBER: 135:280139  
 TITLE: Efficient electrophosphorescence using a doped ambipolar conductive molecular organic thin film  
 AUTHOR(S): Adachi, Chihaya; Kwong, Raymond; Forrest, Stephen R.  
 CORPORATE SOURCE: Universal Display Corporation, Ewing, NJ, 08618, USA  
 SOURCE: Organic Electronics (2001), 2(1), 37-43  
 CODEN: OERLAU; ISSN: 1566-1199  
 PUBLISHER: Elsevier Science B.V.  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

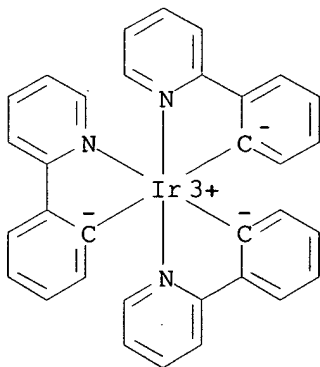
AB The authors demonstrate a high efficiency org. electrophosphorescent device comprised of a 4,4',4''-tris(3-methylphenyl-phenylamino)triphenylamine (m-MTDATA) hole transport layer and a 4,4'-N,N'-dicarbazole-biphenyl (CBP) host doped with the metalorg. phosphor, fac-tris(2-phenylpyridine)iridium (Ir(ppy)3) as the green light-emitting layer. The device exhibits peak external quantum and power efficiencies of  $(12.0 \pm 0.6)\%$  and  $(45 \pm 2) \text{ lm/W}$ , resp., corresponding to .apprx.60% internal quantum efficiency. A luminance of  $1850 \text{ cd/m}^2$  is obsd. at a c.d. of  $10 \text{ mA/cm}^2$ . The device operating properties are controlled by electron injection into, and transport by the CBP layer along with hole injection from m-MTDATA

directly into the Ir(ppy)<sub>3</sub> highest occupied mol. level, leading to direct carrier recombination and exciton formation on the phosphor dopant. Ambipolar conduction properties of the Ir(ppy)<sub>3</sub>:CBP layer are established by anal. of triplet-triplet annihilation, exciton formation and the luminance-current-voltage characteristics.

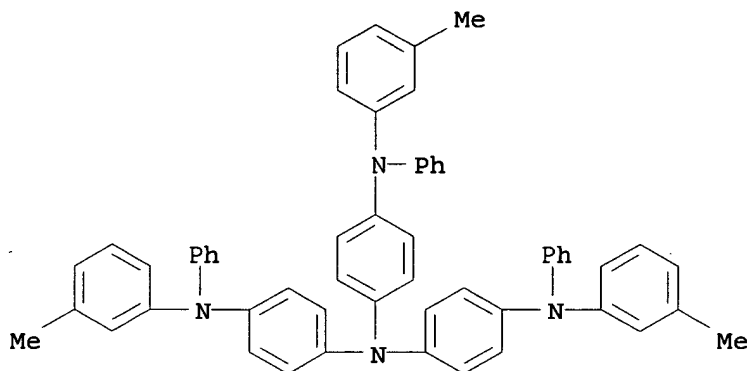
IT 58328-31-7 94928-86-6 124729-98-2,  
4,4',4''-Tris(3-methylphenyl-phenylamino)triphenylamine  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(efficient electrophosphorescence using a doped ambipolar  
conductive mol. org. thin film)  
RN 58328-31-7 HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
NAME)



RN 94928-86-6 HCAPLUS  
CN Iridium, tris[2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22) -  
(9CI) (CA INDEX NAME)



RN 124729-98-2 HCAPLUS  
CN 1,4-Benzenediamine, N-(3-methylphenyl)-N',N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]-N-phenyl- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 58328-31-7

94928-86-6 124729-98-2, 4,4',4''-Tris(3-methylphenyl-phenylamino)triphenylamine

RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(efficient electrophosphorescence using a doped ambipolar  
conductive mol. org. thin film)

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

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